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finish

THE MAGAZINE OF
Appliance AND
Metal Products MANUFACTURING

FROM RAW METAL TO FINISHED PRODUCT

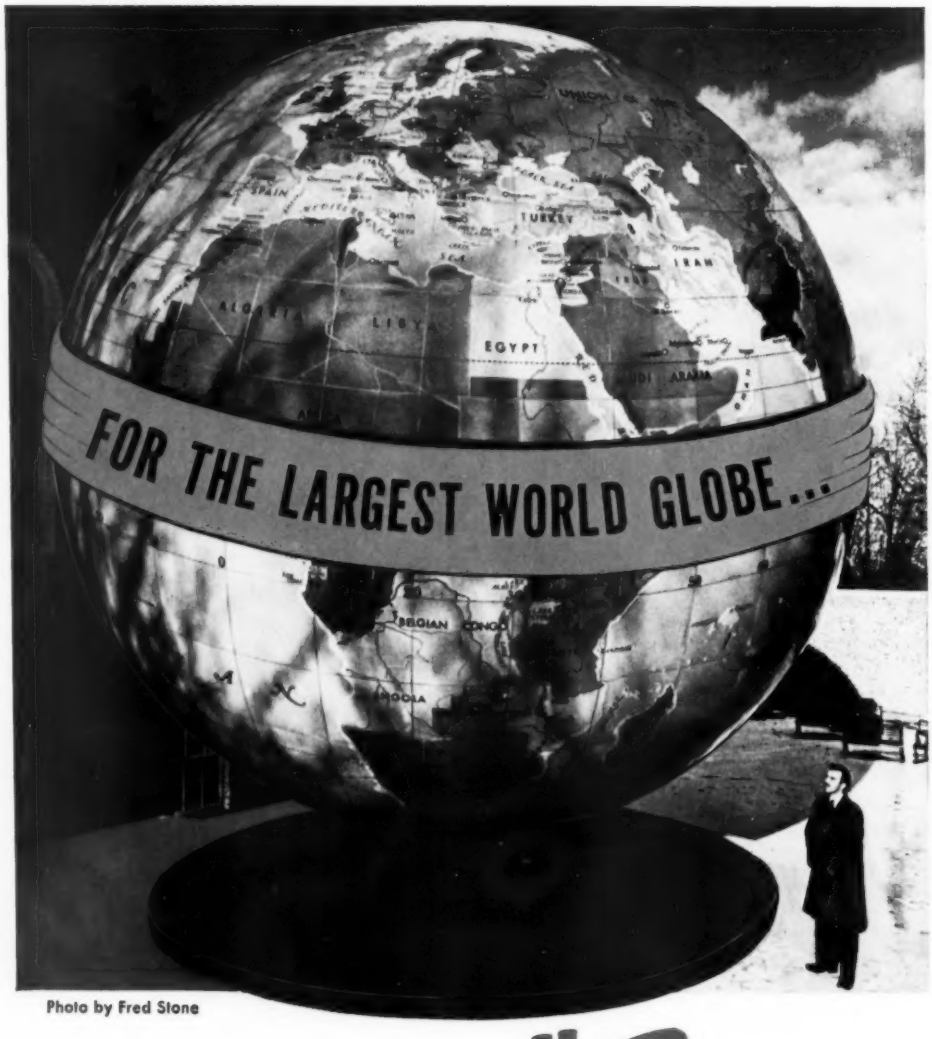


Photo by Fred Stone

Stands on Babson Institute Campus

29 feet in diameter

Fabricated with formed steel sheets

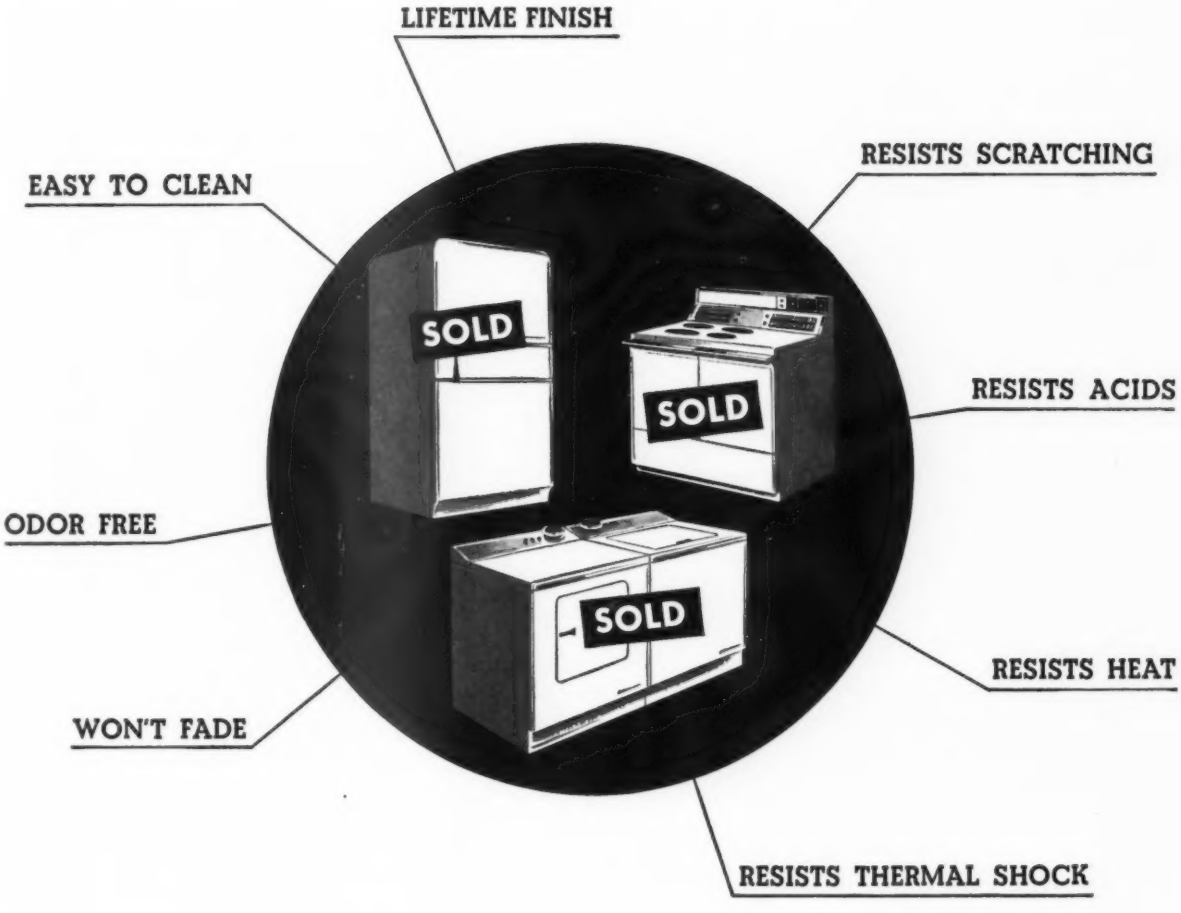
Porcelain enameled in 20 colors

Colors by "Ceramic"

This gigantic world globe presented one of the more complicated color problems encountered in porcelain enameling. The entire surface was divided into 584 curved panels which were preformed and enameled before assembling over the interior framework. The 20 different colors and tints had to match perfectly at the panel edges, and a single section frequently included several different colors.

The enameling was done by The Bettinger Corporation, using colors furnished by "Ceramic."

CERAMIC COLOR & CHEMICAL MFG. CO.
New Brighton, Pa., U.S.A.



How Porcelain Enamel

can put more SELL in your products

A porcelain enameled finish on your products can give you many powerful sales advantages. Porcelain enamel resists food acids, stains, scratches, and thermal shock. It won't burn, rust, or discolor, and is as easy to clean as a china plate. It's a lifetime finish that doesn't fade . . . stays color-fast.

To insure best results with porcelain enamel, a base metal with uniform flatness and bonding characteristics is needed. This is why Armco Enameling Iron has been specified by more porcelain enamelers over a longer period than any other base metal. Armco supplied the first sheets of this special metal more than 40 years ago. Since then it has become known as the "World's Standard Enameling Iron."

Let us send you our catalog on "Armco Enameling Iron." This informative booklet contains helpful tips on fabricating, welding, cleaning, pickling, and porcelain enameling. Just fill in and mail the attached coupon for a free copy.

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July · 1956

VOL. 13 · NO. 7

FEATURES

Page

PRICE CUTTING, MARKETING, POTENTIAL IN COLOR ARE TOPICS AT IAM 24TH ANNUAL CONVENTION....27

PORCELAIN ENAMELING AT CAMEO.....33
by Gilbert C. Close, Western Editor for *finish*

YES, STAINLESS STEEL CAN BE ETCHED.....39
No. 4 of a series by William E. McFee

HAVE YOU INVESTIGATED LOW NICKEL STAINLESS?.....40

METHODS IN USE FOR MARKING PLASTIC PARTS.....30

PRACTICAL INNOVATIONS HIGH-LIGHT WEST COAST METAL TREATING SYSTEM.....42

COMFORT IS OUR BUSINESS.....53
A REPORT ON THE MITCHELL MANUFACTURING COMPANY
CASHING IN ON COMFORT by J. W. Alsdorf, president.....54
ENGINEERING THE MITCHELL by Frank J. Scire.....56
MANUFACTURING THE MITCHELL by Hugo Hartmann, Jr.....56
SELLING THE MITCHELL by Eugene C. Tracy.....57
PROMOTING THE MITCHELL by Howard C. Haas.....57

ENGINEERING DETAILS FOR THE MITCHELL ROOM CONDITIONER.....58

MITCHELL MANUFACTURES COMFORT.....60

SAFE TRANSIT SECTION.....91

COMBATING THE SEASONAL TREND IN SHIPPING DAMAGE—Progress Report No. 3.....92

SAFE TRANSIT NEWS.....94

DEPARTMENTS

THE FINISH SPOTLIGHT—Hotpoint's Super Skillet.....15
FROM THE EDITORS' MAIL.....5
INDUSTRY MEETINGS.....6
INDUSTRY NEWS AND PERSONALS.....70
SUPPLIER NEWS.....85

finish

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A trade publication devoted to the interests of the metal products manufacturing industry with special editorial attention to home appliances. The editorial scope covers design, engineering, market and statistical information and technical and practical information on plant facilities and all phases of manufacturing "from raw metal to finished product." Free controlled circulation to top management, purchasing, engineering and key plant management and supervision in metal product manufacturing plants. To others, subscription price is $5.00 per year, domestic. To all other countries $8.00 per year (U.S. funds).

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METAL PRODUCTS MANUFACTURING FROM RAW METAL TO FINISHED PRODUCT

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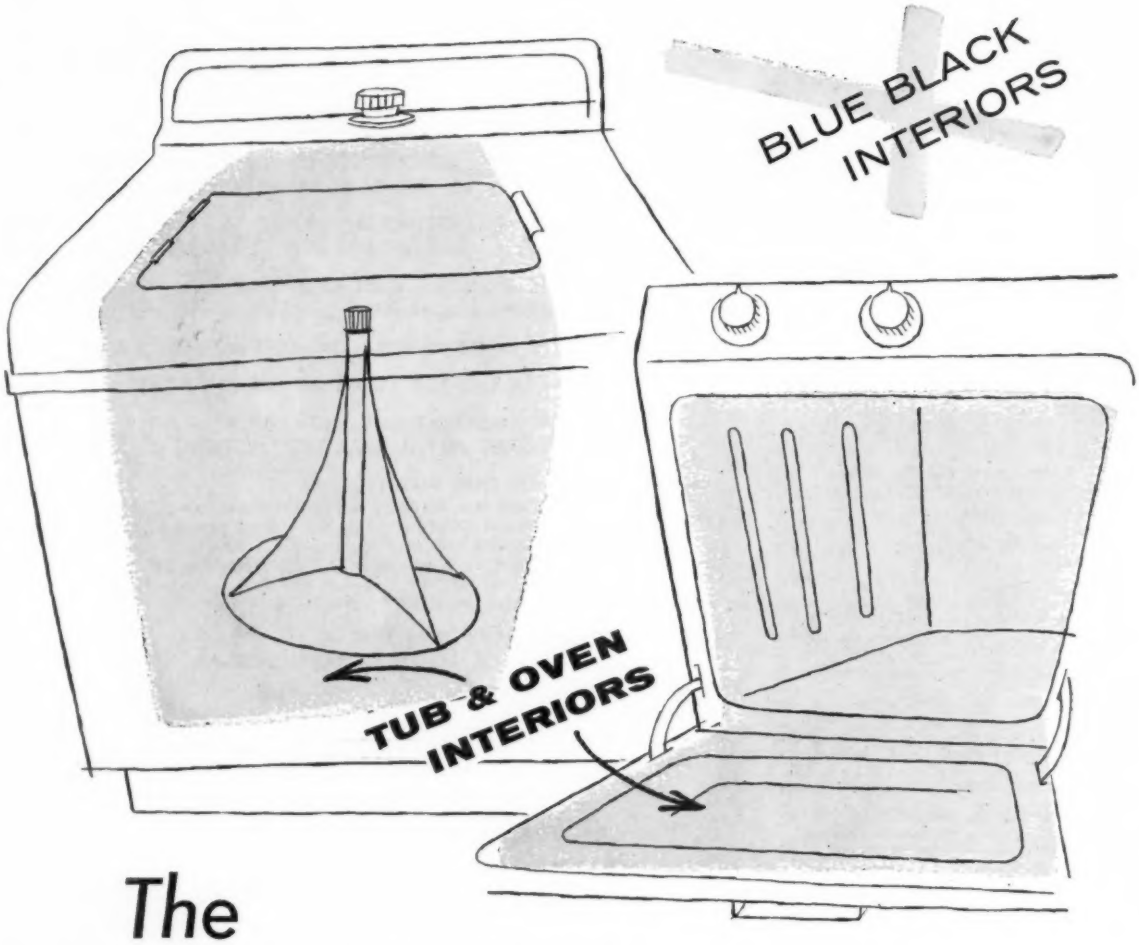

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General Offices, Works and Research Laboratories:
Niagara Falls, New York

from the Editor's Mail

interested in barrel painting

Gentlemen: We would appreciate your sending information as to barrel painting. We understand that you can recommend pamphlets and books on this subject. We are interested in making up our machines to barrel paint small parts. . .

Ray Rodick
Purchasing Agent
Nat'l. Engineering & Mfg. Co.
Sedalia, Missouri

We have sent Mr. Rodick a list of companies currently engaged in supplying equipment and materials for barrel finishing. They are the best source for the information and literature requested.

would like to receive *finish*

Gentlemen: A borrowed copy of your *finish* magazine has created considerable interest among the engineers of the painting and finishing section of our manufacturing methods development laboratory. We would appreciate having our name added to your free circulation list.

George W. Jernstedt
Director Mfg. Laboratory
Westinghouse Electric Corp.
Pittsburgh, Penna.

Mr. Jernstedt has been added to our mailing list.

glass-lined water heater tanks

Gentlemen: We would appreciate receiving information on techniques which are employed for the glass lining of water heating tanks. . .

J. H. Dudek
International Div.
American Chemical Paint Co.
Ambler, Penna.

We have sent Mr. Dudek reprints of a number of features on glass lining of water heater tanks which have appeared in *finish*. We call your attention to the article appearing in the June issue describing special equipment for blast cleaning of both flat sheets and water heater "shells".

infra-red drying

Gentlemen: In your December 1953 and 1954 issues of *finish* magazine we have been told that there are instructive articles on infra-red drying. If possible, please send us these articles. We are considering drying sprayed porcelain ware by this method.

R. Mark Ritzema
Kelvinator Div.
American Motors Corp.
Grand Rapids, Michigan

Tearsheets were promptly sent to Mr. Ritzema.

would like to receive *finish*

Gentlemen: Would you please add my name to your list of subscribers to receive *finish* each month? A copy of this excellent magazine is already received by Astatic, but, since it is circulated throughout the plant, I am not disposed to clip articles of special interest. . .

C. Alan Lindquist, Jr.
Development Engineer
The Astatic Corp.
Conneaut, Ohio

Mr. Lindquist has been added to our mailing list.

third statistical review

Gentlemen: Please send us the annual (statistical) issue of *finish* . . . in your April issue, page thirty.

Alice Braidy, Librarian
William E. Hill & Company, Inc.
Management Consultants
New York, New York

Gentlemen: The traffic consultant in our Chicago office has forwarded a copy of the Third Annual Statistical Review to me for my information. It is the first time I have seen any of your reviews, and I would appreciate very much receiving copies of the 1st and 2nd annual statistical reviews.

Frederick J. Donahue, Jr.
Fibre Box Association
Washington, D. C.

Gentlemen: I am very much interested in receiving your "3rd Annual Market and Statistical Review" about the appliance and metal products manufacturing field and would appreciate two or three additional reprints of this fine folder.

Harold Melloy
Sales Manager
Patent Button Co. of Tenn.
Knoxville, Tenn.

Finish has been pleased with the wide response to our statistical reports. A second printing of the 3rd review (April, pp. 30-36) has been completed, and readers desiring copies of any of the 1954-55-56 reviews may obtain them by request to the editor.

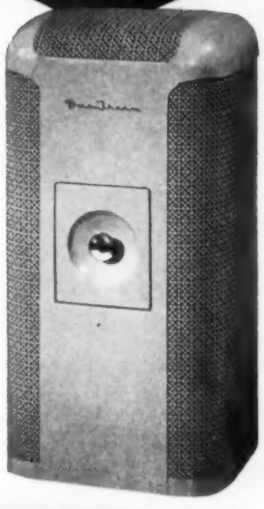
Appreciates Container Report

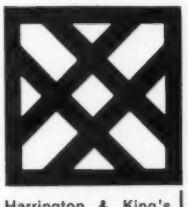
Gentlemen: Very much interested in your publication, in the January issue of *finish* regarding the "Modern Closing and Sealing System of Corrugated Containers", as set up at the Whirlpool-Seeger Corp. in Clyde. Our plans for future re-arrangement include the revising of our packaging and crating dept., and would certainly be interested in obtaining further technical data regarding the above subject.

W. J. Simak
Plant Engineer
Apex Electrical Mfg. Company
Cleveland, Ohio

Mr. Simak's request has been forwarded to the source of the material which was presented in January, so that detailed information may be forwarded to his attention.

DUO-THERM selects H&K MORESQUE PATTERN PERFORATIONS to combine
• Heating Efficiency
• Maximum Strength
• Smart Design
• Cleanliness





Harrington & King's Moresque Pattern . . . one of thousands of patterns available for perforating metals for your products. For full range of H & K patterns, fill in and mail coupon to office and warehouse nearest you.

The metal casing for this Duo-Therm Radiant Circulator was perforated by Harrington & King. H & K can supply perforated materials — with round holes, square holes, slots, ornamental patterns, oblong holes, oval holes — the pattern "just right" for your product. We will be glad to work with you on your perforating requirements.

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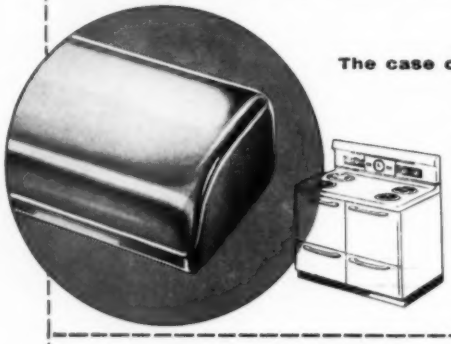
Actual case histories of unusual design problems solved by Pyramid Mouldings

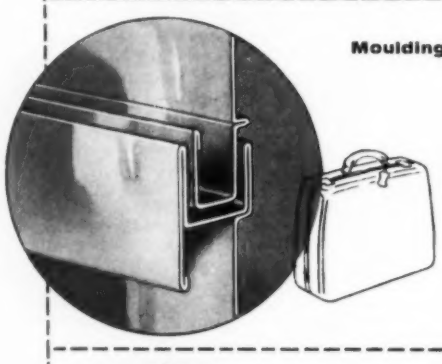
Pyramid Mouldings

Design Clinic



The case of the range lamp...

following the trend to longer lines has been ideally answered with rolled mouldings. Made to any desired length without change in tooling, ends are often formed as shown to eliminate costly end caps.



Mouldings made "case" history...

in one of America's leading luggage lines by adding the finishing touch to smart styling with these intricately formed bezels. Rolled to shape and bent to exact case contour, they covered raw edges, added structural strength, provided dustproof construction.

The case of the missing "drop-out"...

has meant money to the many manufacturers who have found that mouldings rolled in spirals and cut in circles eliminates waste unavoidable with stamped parts. Bezels, burner rings or *any* ring or bezel can be economically roll formed by Pyramid.

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Pyramid Mouldings Inc.

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MEETINGS

NATIONAL HOUSEWARES SHOW

National Housewares and Home Appliance Manufacturers Exhibits, Auditorium, Atlantic City, N. J., July 9-13.

PACKAGING INSTITUTE FORUM

Packaging Institute, 18th Annual Forum, Hotel Statler, Cleveland, September 10-12.

PEI ANNUAL MEETING

Porcelain Enamel Institute, 25th Annual Meeting, The Broadmoor, Colorado Springs, Colorado, September 19-21.

ELECTRICAL ENGINEERS MEETING

American Institute of Electrical Engineers, Fall General Meeting, Morrison Hotel, Chicago, October 1-5.

GAS ASSN. CONVENTION

American Gas Association, Annual Convention, Atlantic City, N. J., October 15-17.

PACKAGING EXPOSITION

Society of Industrial Packaging and Materials Handling Engineers, 11th Annual National Protective Packaging and Materials Handling Exposition, Kiel Auditorium, St. Louis, Mo., October 23-25.

SAFETY CONGRESS & EXPOSITION

44th National Safety Congress and Exposition, Conrad Hilton, Congress, Morrison and La Salle hotels, Chicago, October 22-26.

HOME LAUNDRY CONFERENCE

Tenth National Home Laundry Conference, American Home Laundry Manufacturers Association, Conrad Hilton Hotel, Chicago, November 1-2.

ELECTRICAL MFRS. MEETING

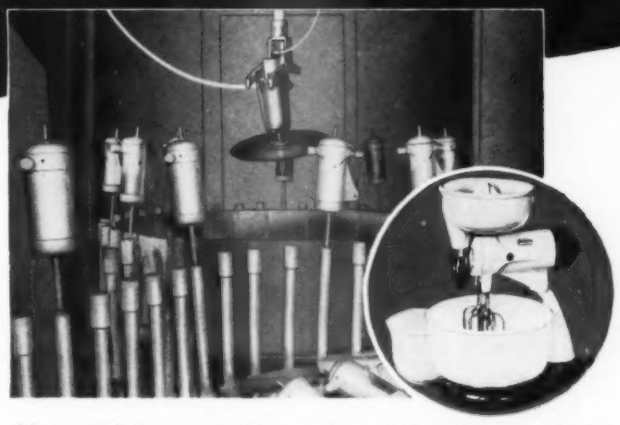
National Electrical Manufacturers Association, Traymore Hotel, Atlantic City, New Jersey, November 12-16.

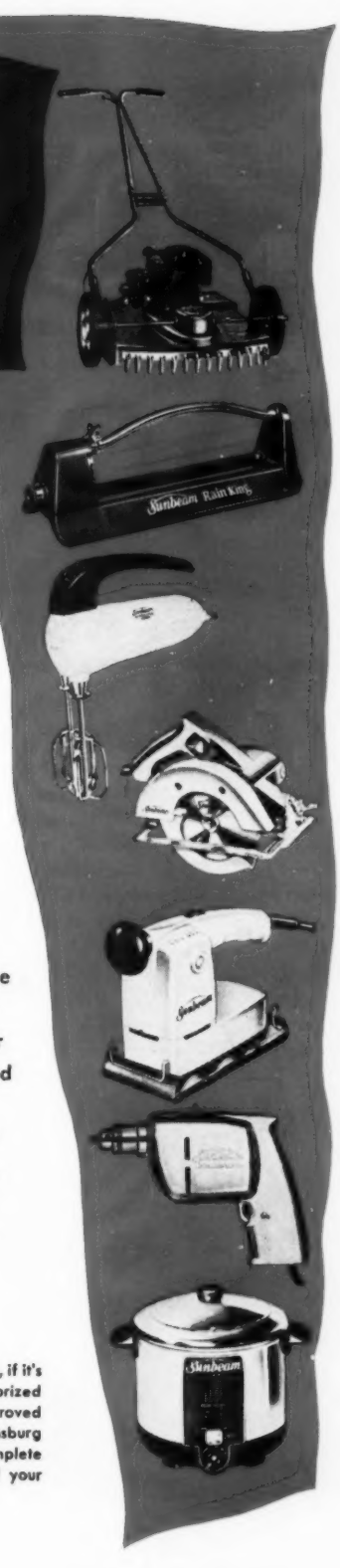
REFRIGERATING ENGRS. MEET

Semi-annual Meeting, American Society of Refrigerating Engineers, Boston, Mass., November 25-28.

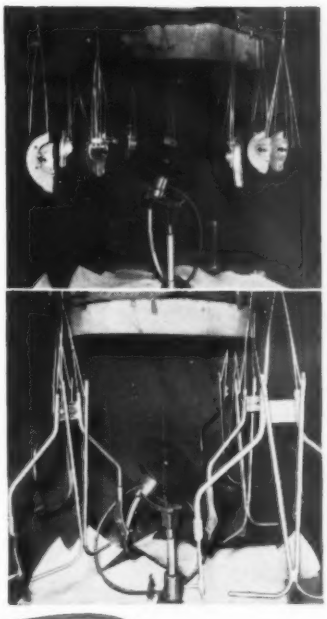
Sunbeam is particular about the uniform high quality finish on their products, so SUNBEAM relies on

RANSBURG NO. 2 PROCESS
Electrostatic Spray Painting





Along with improving the quality of the brilliant white finish on Mixmaster parts, an 80% paint savings was achieved when SUNBEAM switched from hand spray to RANSBURG Electrostatic Spray Painting



Protective clear lacquer is applied to upper saw guard (upper left) with RANSBURG NO. 2 PROCESS on this line in SUNBEAM's plant 2, Chicago. Other hardware items, including the Drillmaster and Sunbeam Sander are lacquer-coated electrostatically here. Lawn mower parts, such as the handles shown (lower left), the Rain King lawn sprinkler base, and the Sunbeam Fryer base also are painted efficiently with Ransburg No. 2 Process Electro-Spray.

Regardless of the type of product you manufacture, if it's painted—and if your production justifies conveyorized painting—you should look into the savings and improved quality which can be yours with one of the Ransburg Electrostatic Processes. May we tell you about complete Ransburg services, including the test painting of your products in our laboratories?

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Ransburg **ELECTRO-COATING CORP.**

Indianapolis 7, Indiana

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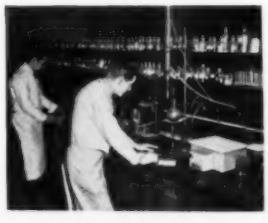

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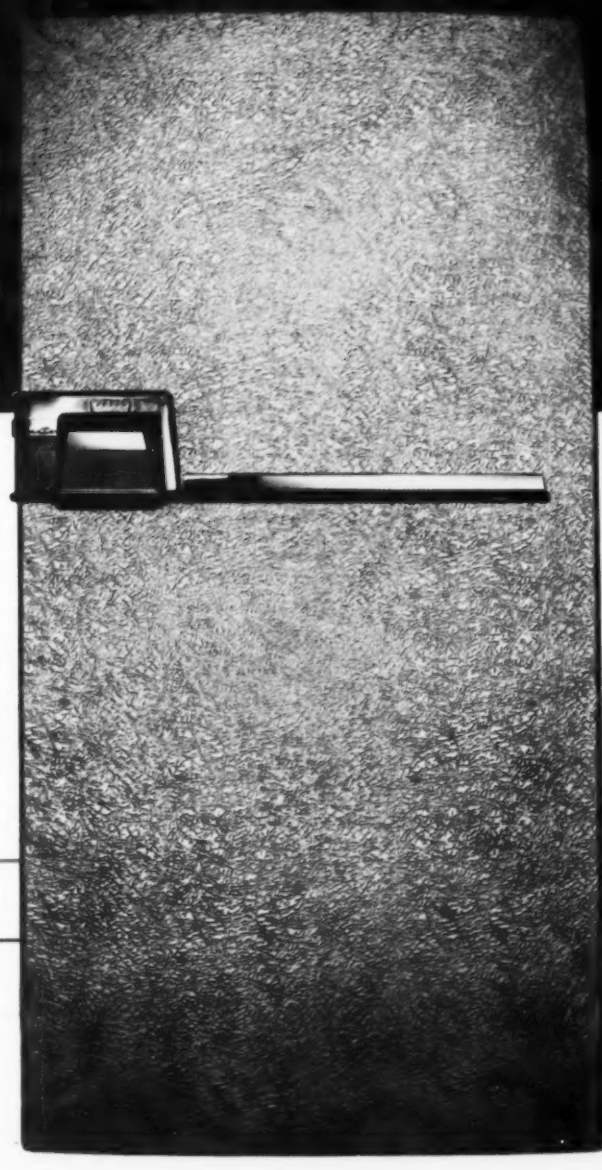
...for the production of appliance parts with



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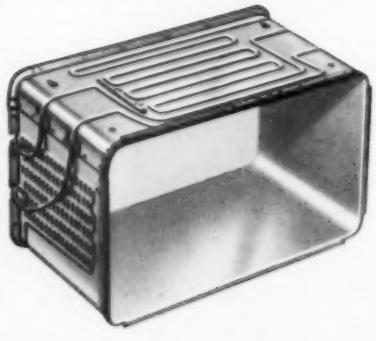
embossed and color anodized

Aluminum parts like these combine the newest in beauty and styling with the latest in engineering...

...and parts like these assure added sales appeal and product quality when you rely on Reynolds for the fabrication, the finish and the color.

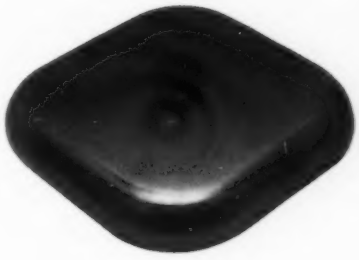


Tubed Sheet One-Side-Flat Refrigerator Evaporator
—gold anodized

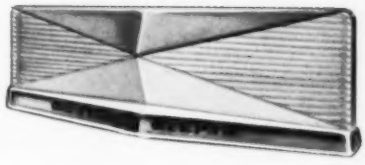
Tubed Sheet One-Side-Flat Refrigerator Evaporator
—blue anodized

Tubed Sheet One-Side-Flat Refrigerator Evaporator
—copper anodized

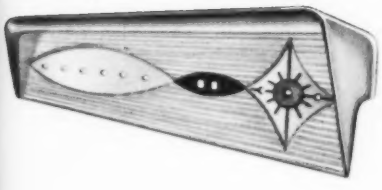
Refrigerator Evaporator Door Handle
—blue anodized



Fry Pan Cover—copper anodized

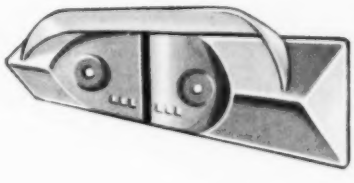


Refrigerator Beverage Keeper Door
— gold and blue anodized



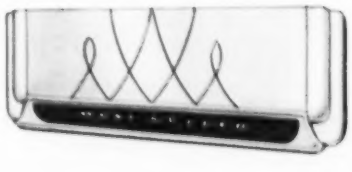
Range Panel—gold and blue anodized,
black painted

Portable TV Cabinet—copper anodized



Washer-Dryer Panel—gold and blue anodized

Refrigerator Evaporator Door—copper anodized



Refrigerator Meat Keeper Door
—gold anodized, black painted

Refrigerator Evaporator Door
—gold and blue anodized, white painted

Here's why it pays to rely on

REYNOLDS ALUMINUM FABRICATING SERVICE

for production of quality appliance parts

All-Aluminum Refrigerator Door—
color anodized.
Door Cap—clear anodized

VAST FABRICATING FACILITIES, experienced design and engineering assistance and quality control from mine to finished product are three good reasons why it pays to rely on Reynolds Aluminum Fabricating Service for production of aluminum appliance parts.

And—Reynolds can supply these parts with the *finish* you want and in the *color* you want because Reynolds greatly expanded finishing facilities are unsurpassed anywhere. Reynolds tremendous investment in today's latest automatic finishing equipment assures you finer finishes on the aluminum parts you design . . . gives you new flexibility in your design thinking. And Reynolds years of technical experience with practically every finishing process and technique applicable to aluminum go hand in hand with these facilities.

- Rely on Reynolds for *color anodized* finishes in gleaming colors of your choice—in-the-metal finishes that will never pit or chip or flake or tarnish.
- Rely on Reynolds for *clear anodized* finishes with the mellow luster and the "look of sterling".
- Rely on Reynolds for many other mechanical, chemical and paint film finishes on your aluminum parts.

For the highest quality from "start to *any finish*", let Reynolds fabricate and finish your aluminum parts.

For full details on Reynolds fabricating and finishing facilities, contact your nearest Reynolds Branch Office or write *Reynolds Aluminum Fabricating Service, 2001 South Ninth Street, Louisville 1, Kentucky.*

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BLANKING • EMBOSSING • STAMPING • DRAWING • RIVETING • FORMING
ROLL SHAPING • TUBE BENDING • WELDING • BRAZING • FINISHING

look...

it's

TITANOX®

The white coating on these venetian blinds was pigmented with TITANOX-RA—the rutile "pure" titanium dioxide white pigment. Because of its maximum hiding power, TITANOX-RA is especially useful in flexible thin films, on metallic surfaces. On products that must withstand bending or forming—containers, collapsible tubes, etc.—TITANOX-RA is your No. 1 choice in white pigments. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; Atlanta 5; Boston 6; Chicago 3; Cleveland 15; Houston 2; Los Angeles 22; Philadelphia 3; Pittsburgh 12; Portland 14, Ore.; San Francisco 7. In Canada: Canadian Titanium Pigments Limited, Montreal 2; Toronto 1.

Titanium Pigment Corporation is a subsidiary of National Lead Company

as the SIZZLE sells the steak

the DAZZLE of Chromium SELLS THE STOVE

LET Apollo

SHOW YOU THE PRACTICAL WAY TO ADD THE SALES-MAGIC OF CHROMIUM TO ANY APPLIANCE

There's magic customer appeal in the gleaming beauty of chromium. Accessories, ornaments and functional parts finished in mirror-like chrome catch the eye, strike the fancy and win the choice of shoppers.

But what about cost in such up-grading of merchandise? You know piece-plating would price it out of competition. Well, here's where APOLLO ChromSteel—prefinished in sheets—allows an economical approach. APOLLO's large-scale, precision finishing costs demonstrably less than piece-plating.

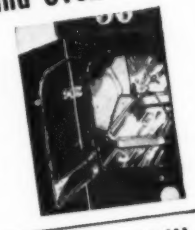
That's why stove manufacturers are putting more and more APOLLO ChromSteel on the payroll. Adding desirable dazzle to their products they (1) sell more units and (2) realize larger dollar sales per unit. Illustrations to the right show what they are doing:

•

APOLLO Prefinished Steel—CHROMIUM, NICKEL, BRASS and COPPER Finished . . . polished or satin . . . plane, striped or dimensional patterns—serves as effective, functional sales features on countless appliances.

APOLLO ChromSteel Lining on Built-In Rotisserie and Oven

Top, bottom, sides, end and door of glistening, easy-to-clean chromium adds aristocratic touch to the built-in rotisserie on a number of popularly priced gas and electrical ranges.



APOLLO ChromSteel Broiler Grill

The efficiency of chromium for grills has been long established. But its present day use as a clincher to sell stoves—at insignificant outlay per unit—has become increasingly popular and successful.

APOLLO ChromSteel Individualized Control Panels

Modern stove makers capitalize on singularly distinctive control panels. APOLLO offers uniquely striped and dimensionally patterned Chrome, Copper or Brass finished steel specially for this purpose.

Ask about APOLLO's Product Design Service. Professional sketches economically adapting APOLLO improvements to present or planned products are available to you without obligation.

FAN GRILLS

TABLE BROILERS

TOASTERS

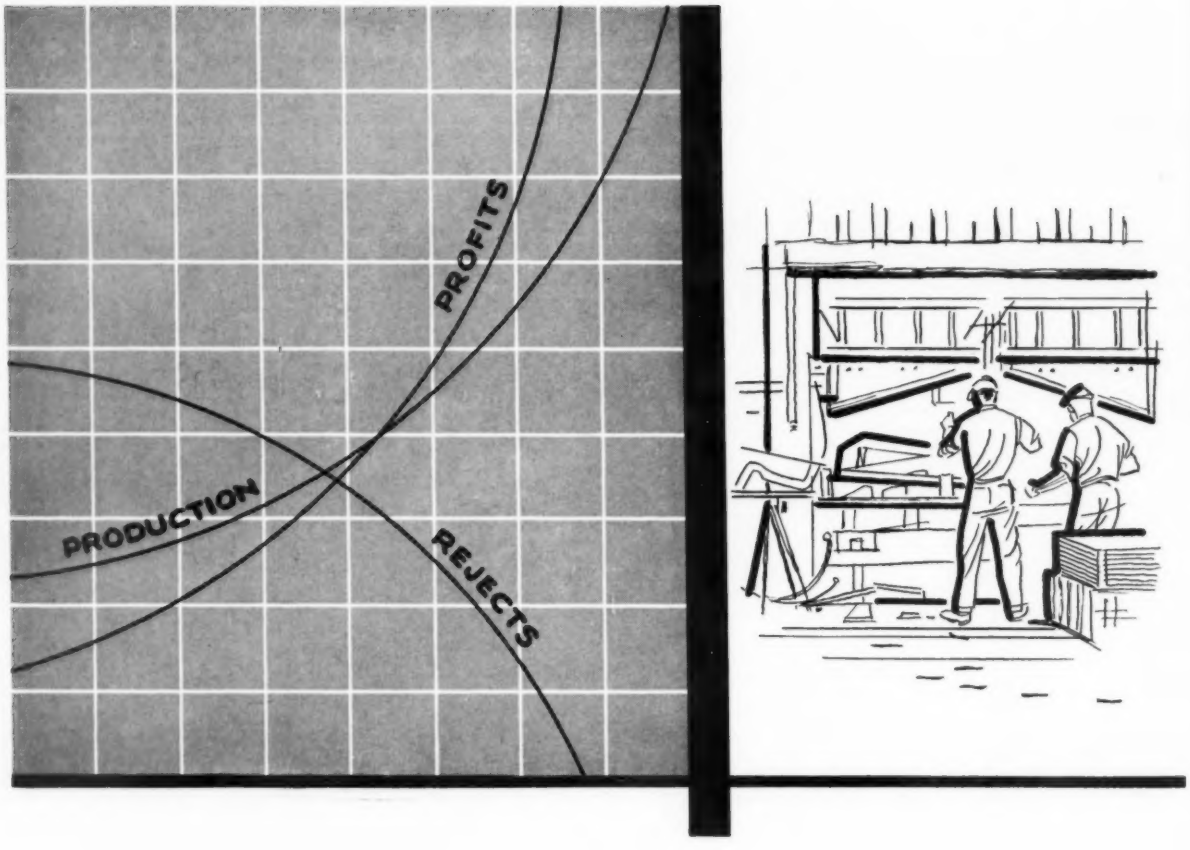
HEATERS

Apollo METAL WORKS

6684 S. OAK PARK AVENUE • CHICAGO 38, ILLINOIS

THE finish spotlight

A super skillet, Hotpoint's "Mark 313" deep fat frying machine combines high speed frying action with such accessory functions as semi-automatic draining, straining, and fat change-over. The machine takes its name from the fact that it produces 313 standard 2-ounce servings of french fries in 28 pounds of fat.



Production up... Rejects Down... Profits Rise When you use Youngstown Sheets and Strip

Today's improved deep drawing and stamping techniques demand you use the highest quality steel available. That material, without question, is Youngstown Sheet and Strip. We blend the required combination of surface finish, tensile strength and ductility into a sheet that guarantees almost continuous press runs of even the most difficult formed parts.

Why not join the growing ranks of our satisfied customers who report, "Production increasing—Rejects falling off—Fabrication costs down."

For more information, call or write your nearest Youngstown District Sales Office—or write direct to our Home Office.

QUALITY YOUNGSTOWN SERVICE

Youngstown

COLD ROLLED SHEETS AND STRIP

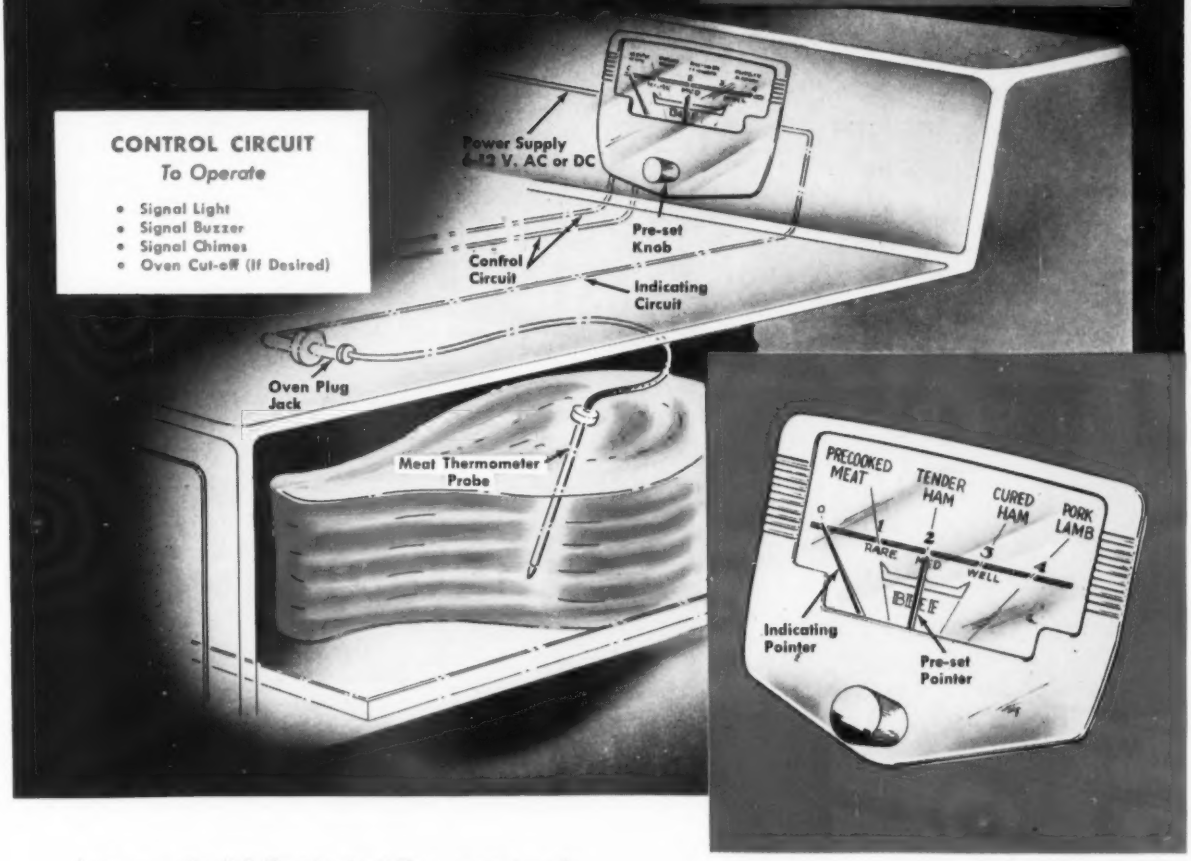
THE YOUNGSTOWN SHEET AND TUBE COMPANY *Manufacturers of Carbon, Alloy and Yoloy Steel*

General Offices Youngstown, Ohio District Sales Offices in Principal Cities.

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - BLACK PLATE - RAILROAD TRACK SPIKES - MINE ROOF BOLTS

ROASTING *NOW* AUTOMATICALLY CONTROLLED

ANOTHER NEW KS DEVELOPMENT



Last year, the K-S Electric Meat Thermometer made news by outmoding the stoop, squint and guess routine for roasting. Its indicator, in full view on your range instrument panel, gives the cook reliable information on the progress of the roasting cycle until it is finished to a "turn", fit for the most discriminating epicure.

Something New has been added—AUTOMATION

When the roast or fowl goes into the oven, the cook sets a pointer on the instrument to exactly the degree of doneness she desires. As roasting proceeds, a second pointer moves up indicating the progress of the roasting cycle.

When this indicating pointer reaches the set point, a signal notifies the cook. In addition, if you desire, it will turn off the oven. Thus the cook can devote her full attention to other matters without jeopardizing the perfection of her main dish.

Consider for yourself the value and sales appeal of this new K-S development. Include it in your range.

7501

KING-SEELEY CORPORATION
ANN ARBOR, MICHIGAN

KS

DORTCH
STEVEN MFG. CORP.
900 Alder Drive
NASHVILLE, TENNESSEE
Clare Brothers
LIMITED • PRESTON, ONTARIO
..the PERM
GIBSON REFRIGERATOR COMPANY
GREENVILLE, MICHIGAN
HARDWICK STOVE COMPANY
HARDWICK AUTOMATIC GAS RANGES
ESTABLISHED 1870 • CLEVELAND, TENNESSEE
PEERLESS
PRODUCTS CO.
Gurney
PRODUCTS
NEWARK STOVE COMPANY
NEWARK, OHIO.
J.B.SLATTERY & BRO., INC.
MANUFACTURERS OF
GAS RANGES
CROWN • STOVE • WORKS
A Great Name in Ranges
MAGEE
BOSTON STOVE Foundry Company
READING, MASSACHUSETTS Telephone REading 2-1045
A. BELANGER
LIMITED
THE Enterprise FOUNDRY COMPANY LIMITED
ATHENS STOVE WORKS, INC.
MANUFACTURERS OF STOVES
ATHENS, TENNESSEE
EAGLE RANGE & MANUFACTURING Company
Kelvinator
CROSLEY and BENDIX
HOME APPLIANCES DIVISIONS
AVCO
ETNA
N.V. IJZERGIETERIJEN EN EMAILLEERFABRIEKEN
OPGERICHT 1858
DE ETNA
BREDA
TRANSPORT 17
HARRY C. WEISKITTEL CO. INC.
Real Most Gas Ranges
DM-DETROIT-MICHIGAN STOVE COMPANY
CANADIAN
WESTINGHOUSE
COMPANY • LIMITED
GENERAL
STEEL GSW WARES
UTILITY APPLIANCE CORP.
Hotpoint Co.
A DIVISION OF GENERAL ELECTRIC COMPANY
Mt. Vernon Furnace & Mfg. Co.
HEATING AND COOKING EQUIPMENT
Kelvinator
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Preway Inc.
DIXIE PRODUCTS, INC.
THE Sunray STOVE CO.
BROWN STOVE WORKS, INC.
MANUFACTURERS
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Enterprise
Admiral
ROPER
TRADE MARK REG. IN CANADA
MOFFATS LIMITED
WESTON • ONTARIO • CANADA
WESTINGHOUSE
W

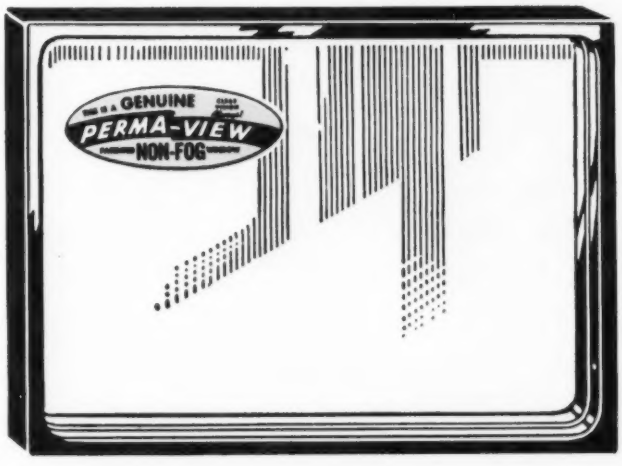
MVIEW "No Fog" oven door window

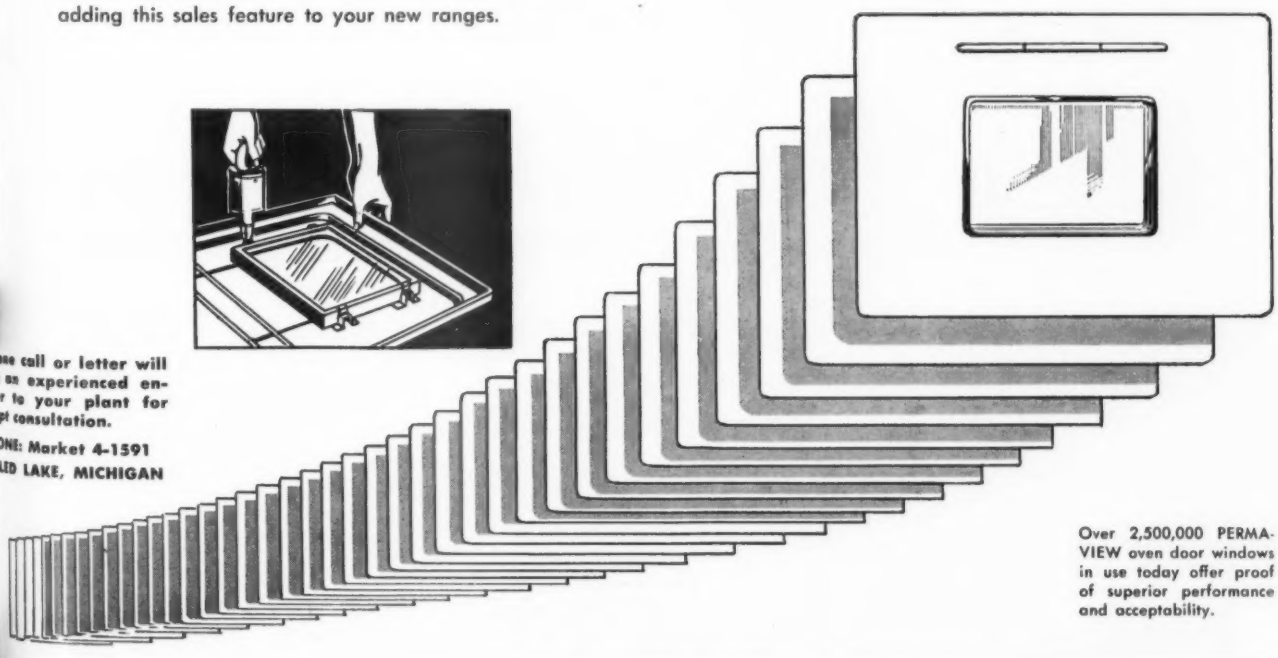
a valuable sales tool for leading range manufacturers engineered to the product for years of carefree use

These well known names and trademarks represent some of the leading manufacturers of gas and electric ranges who are incorporating the steel incased, double pane PERMA-VIEW window in their ranges as a feature with the selling power to move new ranges.

Fifty-two leading manufacturers are now using PERMA-VIEW, the window that is mechanically sealed to prevent vapor infiltration and fogging.

The PERMA-VIEW window is pre-engineered, and comes to you ready for immediate installation in your range. "Out of our carton into your door". Let our specialized production lines serve as a part of your sub-assembly facilities. Phone or write us for complete details on the ease and economy of adding this sales feature to your new ranges.





...ase call or letter will ...g an experienced en... ...er to your plant for ...pt consultation.

...ONE: Market 4-1591
...LLED LAKE, MICHIGAN

Over 2,500,000 PERMA-VIEW oven door windows in use today offer proof of superior performance and acceptability.

MILLS PRODUCTS, INCORPORATED

1015 W. MAPLE ROAD • WALLED LAKE, MICHIGAN

Add the Experience and Skill of Pittsburgh's

415 Finishes Technologists

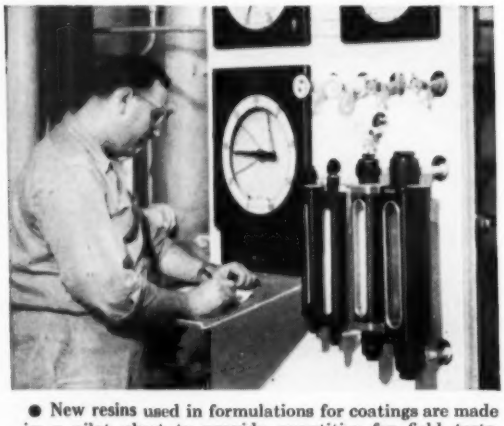
to your finishing staff... without increasing your payroll!

● **Synthesis** of a new compound is one of the first steps in developing a new type of surface coating.

Paint industry's most modern research facilities are at your service to provide you with specialized coatings for your needs.

DO YOU NEED better finishes for the products you are making today? Better finishes for tomorrow's products? Finishes with finer appearance, longer-lasting gloss and color, greater adhesion, more stubborn resistance to stains, grease, moisture, salt, alkalis and acids?

● **If you do . . .** then add the superior skill and knowledge of Pittsburgh's Finishes Technologists to your staff, without increasing your costs. In its new Paint Research Center at Springdale, Pa., Pittsburgh offers you the most modern facilities for fundamental and applied research in the paint industry. Here a highly-trained staff of chemists, engineers and technicians, working with new materials, processes and application methods maintains Pittsburgh's traditional leadership in the field of surface coatings.



● **New resins** used in formulations for coatings are made in a pilot plant to provide quantities for field tests.

● **This manpower** and these facilities are available to help you get better finishes from existing materials or from new chemical compositions. Why not make use of these technologists on your problems? Write, wire or call Pittsburgh Plate Glass Company, Industrial Finishes Division, 1 Gateway Center, Pittsburgh, Pa.

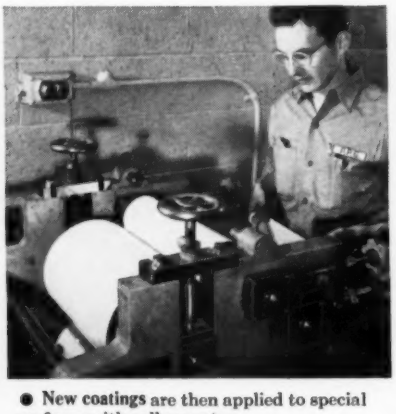
PITTSBURGH PAINTS

PAINTS • GLASS • CHEMICALS • BRUSHES • PLASTICS • FIBER GLASS

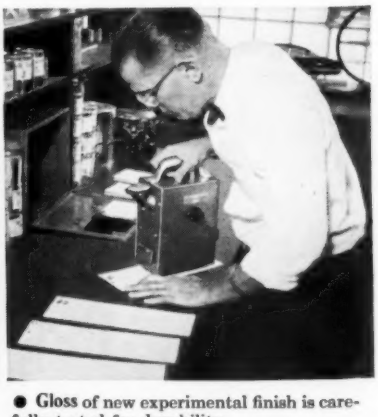
PPG PITTSBURGH PLATE GLASS COMPANY

IN CANADA: CANADIAN PITTSBURGH INDUSTRIES LIMITED

● **Special coatings** are formulated using new resins on a ball mill.



● **New coatings** are then applied to special surfaces with roller coater.



● **Gloss** of new experimental finish is carefully tested for durability.

A NEW NORTHWEST STAR!

Northwest 449 is really big news! This "complete" new water soluble compound replaces complicated powder and liquid combinations . . . eliminates metal cleaning hazards and disposal problems. It's harmless to rack coating and equipment and makes handling and control simple, easy and SAFE. It will save you time and trouble, and make you money.

449 is an unusually efficient soak cleaner, specially developed for preparing non-ferrous metallic surfaces for plating and finishing operations. 449 has unusually long bath life and wide application range . . . costs no more than ordinary cleaners.

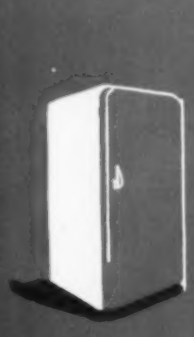
Get our expert analysis of YOUR job by calling or wiring us today.

Remember—the cost per finished piece is the true cost of your cleaner

Chicago Vit Service

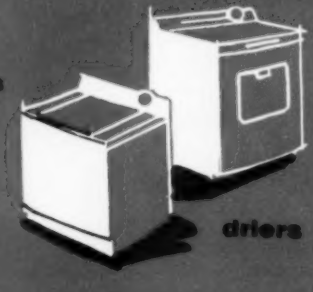
is never further away than your phone

there's a Chicago Vit Frit for every specialized need



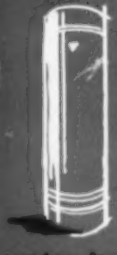
refrigerators

ranges

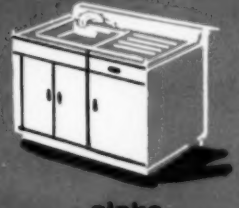


driers

washers

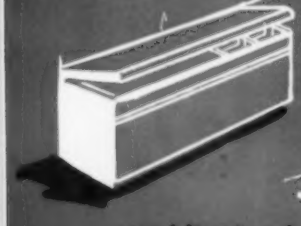


water heaters



sinks

bath-tubs



freezers

architectural

signs

Working side by side with enamel plant personnel is a part of Chicago Vit service that can't be measured in terms of dollars and cents. But it's important to the enamel plant operator, and it encompasses every phase of enamel processing. Chicago Vit customers have learned that this specialized service has helped them to reduce costs and increase production in many ways year in and year out. And the beauty of it all is that it's never further away than the nearest telephone.

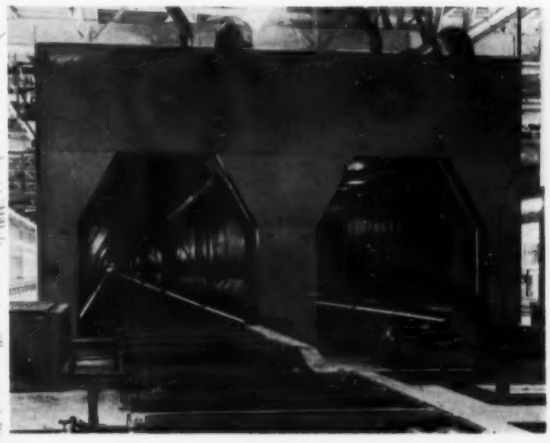
FOR FINEST FRIT – CHICAGO VIT

Chicago Vitreous CORPORATION

1425 South 55th Court Cicero 50, Illinois

This "Famous Name" in Automobiles Repeats Again!

The Chrysler Multi-Million Dollar "FORWARD LOOK" includes BURDETT "Radiant-Heat" OVENS



Entrance of two of the 900 foot Burdett ovens, showing a continuous line of Burdett 10-L Burners along each side.

Interior view of one of the 900 foot "Radiant-Heat" Baking Ovens, showing Burdett 10-L Burners. (Lower corners)

1945 The Burdett "Radiant-Heat" System was subjected to extensive experimentation and testing by Chrysler engineers. Based on these tests, practically all Chrysler production ovens were equipped with the Burdett "Radiant-Heat" Combustion System.

1950 Further Chrysler expansion saw additional Burdett "Radiant-Heat" Ovens installed to accommodate increased production.

1955 Undoubtedly the most extensive and also history making expansion, Chrysler's Multi-Million Dollar "Forward Look" Program demanded top equipment — and again Burdett "Radiant-Heat" Ovens were installed. This installation includes four 900 foot and two 280 foot Burdett "Radiant-Heat" Ovens, equipped with the latest burner development — the Burdett No. 10-L Line Burner.

When such leaders of industry repeatedly choose Burdett equipment their choice is naturally based on scientific analysis and proof of performance.

View of two-zone control panel with temperature controller-recorders and operative controls.

Write for the Burdett story!

BURDETT
MANUFACTURING COMPANY

4918 South Monitor Avenue, Chicago 38, Illinois

DETROIT PHILADELPHIA NEW YORK CLEVELAND DALLAS

Manufacturers of
COMPLETE FINISHING SYSTEMS — "RADIANT-HEAT" SYSTEMS, OVENS, HEATERS, AIR MAKE-UP UNITS, SPRAY BOOTHS AND WASHERS

Be sure it's Burdett — either "Radiant" or "Convection"

when the time comes...

for new and better glass products — whether it be today or 2000 A.D. — Marsco's craftsmen engineering team will develop them.

The Junior Spaceman above has the best in interplanetary protection — a glass space helmet — because glass can be bowed to fit any desired shape and yet it can be tempered to impart extreme resistance to impact.

You or your family don't need space helmets today but chances are glass could improve the utility and beauty of your product and make it more salable today.

Let Marsco's craftsmen engineering team impart to your product all the advantages of glass.

ask for the man from

Marsco

Here are some of the applications for Marsco heat-treated, tempered and hardened glass parts:

- CLOCK & TIMER CRYSTALS
- OVEN DOORS
- RADAR EQUIPMENT
- AIRCRAFT ACCESSORIES
- PHOTOGRAPHIC EQUIPMENT
- LIGHT LENSES
- DIALS & NAME PLATES
- TELEVISION EQUIPMENT
- INSTRUMENTS
- MEDICAL EQUIPMENT

Special shapes for: Instruments, Gauges, Household and Industrial Appliances.

MARSCO MFG. CO., 2909 S. HALSTED ST., CHICAGO 8, ILL.

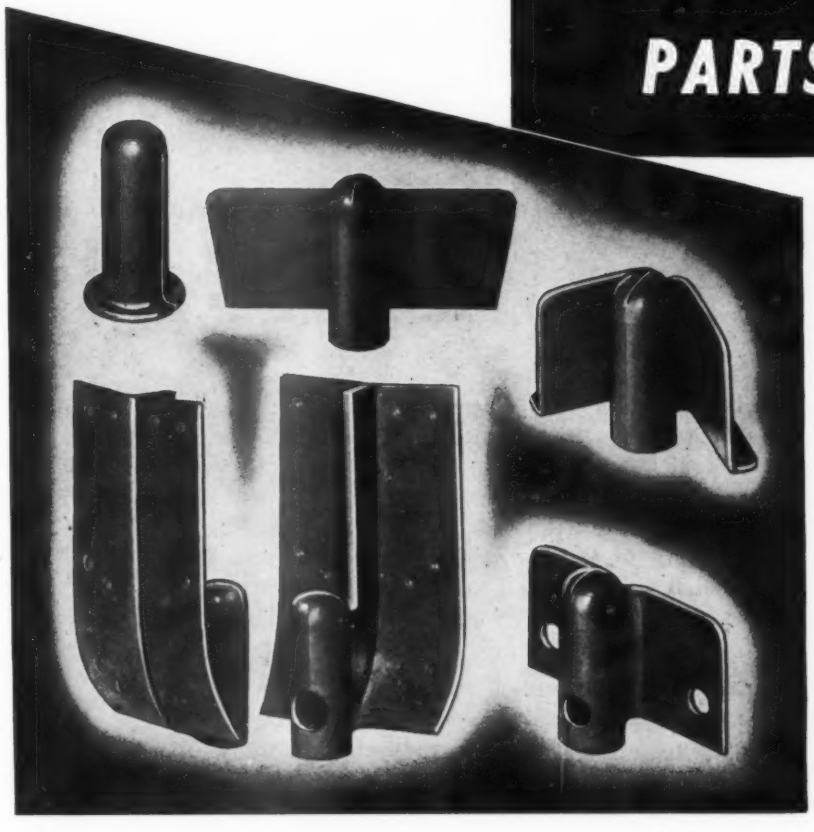
make

Danielson

your stamping headquarters

for ***PRECISION WASH MACHINE PARTS.....***

CASTER SOCKETS AND BRACKETS ...OUR SPECIALTY...



CASTER SOCKETS AND BRACKETS ...OUR SPECIALTY...

Here are a few of the types of caster sockets and brackets manufactured by Danielson. All are produced with extreme economy to exact specifications. Let us figure on your needs.

Our plant is specially geared for this type of work where high production and low cost are a prime factor . . . . . and yet quality and precision workmanship are always our goal.

Our Press Department is equipped with presses ranging from 5 ton to 300 ton capacity, and specializing in deep draw work for Appliance and other Metal Products Manufacturers. Other services include: Shearing — Circle Shear — Spot Welding — Arc Welding — Silver Soldering — Hydrogen Brazing — Polishing — Degreasing — Painting — Assembly — and our complete Tool and Die Department will furnish precision tooling for your own fabricating department.

V. W. DANIELSON
MANUFACTURING COMPANY

3360 W. HOPKINS ST. • MILWAUKEE 16, WISCONSIN • Phone CUSTER 3-3800

We welcome the opportunity to quote — Write, phone, or wire, today!

It's time to take a new look at porcelain enameling!

FOR **LAUNDRY EQUIPMENT,** FOR INSTANCE:

Porcelain enamel is getting better and better, and ever lower in relative cost. Technological improvements in the process and new labor-saving automatic equipment are improving quality, increasing production, effecting substantial economies for many companies. And more developments are on the way—one of which may add 20% to the capacity of your present Porcelain enameling facilities.

CALL IN THE "FERRO TEAM" and let us bring you up to date on new developments in Porcelain enameling. We'll be glad to tell you "what's new" in research, production, quality controls, automatic equipment. And we'll be happy to check your present production setup, tell you where you stand on costs. Remember: you get a *complete* service from Ferro. When and how can we serve you?

FERRO

FERRO CORPORATION

CLEVELAND • NASHVILLE • LOS ANGELES

IN CANADA: FERRO ENAMELS (CANADA) LTD., OAKVILLE, ONT.

WORLD'S ONLY COMPLETE PORCELAIN ENAMELING SERVICE . . . including Plant Layout . . . Furnace Design and Construction . . . Product Design Assistance . . . Enamel Selection . . . Plant Start-Up Supervision . . . Production Trouble-Shooting . . . Cost Analysis Field Studies . . . Porcelain Enameling Materials and Supplies.

finishfoto

IAM PRESIDENT J. L. RAULSTON

Price cutting, marketing, potential of color use topics at IAM 24th Annual Convention at Cincinnati

Institute of Appliance Manufacturers meeting includes biggest display of materials, equipment in history. Leonard Raulston elected new president.

THE 24th Annual Convention of the Institute of Appliance Manufacturers was held at the Netherland-Plaza Hotel, Cincinnati, Ohio, June 4, 5 and 6. Open concurrently with the convention sessions was a bigger-than-ever display of materials, equipment and components.

New officers for 1956-57 are J. L. Raulston, vice president, U. S. Stove Co., S. Pittsburgh, Tenn., president; F. H. Guthrie, president, Newark Stove Co., Newark, Ohio, executive vice president; S. B. Rymer, Jr., president, Dixie Products, Inc., Cleveland, Tenn., vice president — meetings; Walter F. Rogers, president, Crown Stove Works, Chicago, vice president — membership; Wendell C. Davis, president, Cribben & Sexton Co., Chicago, vice president — publications; and Earle B. Kaufman, treasurer, Boston Stove Foundry Co., Reading, Mass., secretary-treasurer.

On Monday afternoon there was a sales and advertising work shop with S. B. Rymer, president of Dixie Products, Inc., presiding. A shop talk session for production, designing and purchasing officials and their suppliers with F. H. Guthrie, president of Newark Stove Company, presiding ran concurrently.

Sales and advertising workshop

In the session headed by *Rymer*, John W. Holzman, vice president — sales, Magic Chef, Inc.; Fred A. Weaver, director of market research, Tappan Stove; S. C. Baer, president, S. C. Baer Co. (advertising); and J. R. Chapman, general manager of product service, Whirlpool-Seeger Corp., discussed such subjects as changing major appliance outlets, market measurement, advertising programs for an "average-size appliance manufacturer" and improvement of product service.

Holzman gave examples of department stores that have been transformed from "one price" stores to "cut price" stores to compete with other appliance outlets. This is being done, he said, so the buyer will not gain the impression, through comparison of appliance prices, that the store is overcharging on other articles. Emphasizing the importance of the chain store, he referred to a section of the Los Angeles area where it is reported that Sears alone handled 23 per cent of the gas range sales during 1955.

"Agent" development problem

Holzman referred to the "agent" of Chicago and New York as an outlet to watch although not considered of great importance currently. The "agent" sells appliances by using one, two or three furniture stores as show rooms. He sells the merchandise on the floor, and it is delivered by the store, but the agent handles sales and financing. The latter is said to encompass as much as 20 per cent interest.

The 40 per cent discount on range sales is a thing of the past — 24, 25 and 28 per cent margins are now effective in some range set ups, he asserted.

Referring to the discount house, Holzman said that there is no uniformity with regard to policies and sales practices. The only uniformity is in the fact that they all discount. This includes both department stores and appliance stores.

A new trend of possible importance is the "individual" sales outlet which sells "memberships", he said. A membership of $12.50 sold to six or twelve other individuals enables this individual to go to a store and ask for a percentage for the six to twelve unit sales.

Automatic gas range sales faltering

Fred A. Weaver reported that LP and electric ranges are on the rise, but automatic gas ranges have not sold up to expectations. He reported that 33-1/3 per cent of the gas ranges sold in 1955 were either 30-inch ranges or built-ins.

Weaver decried that, although the industry is "crawling on its knees" in merchandising, it has kept up in technical advancements.

"But technical developments won't stop here. Already demonstrations of atomic energy and solar energy for household uses have been shown on television. Articles about them have appeared in business magazines. Articles

on magnetic repulsion and ultrasonics have appeared in newspapers. Engineers are exploring the application of these magic energies in every field. Who knows what energy sources will be supplying appliance or household requirements in the near future? The thinkers of today are the builders of tomorrow."

S. C. Baer presented a complete and detailed outline of an appropriate advertising program for stove manufacturers. He referred to a survey showing that, of the group surveyed, budgets ran from 1 per cent to 5½ per cent with the average at 3 per cent. Stove manufacturers in the range of 250,000 to 2,500,000 sales apply up to 4.85 per cent to advertising with 2 per cent about the average for the stove industry. (10.85 per cent of these advertising budgets go to business publications.)

J. R. Chapman discussed the increasing importance of service programs and their relation to sales and advertising. "The complexity of today's automatic

FINISHFOTOS OF SOME OF THE EVENTS AT THE 24TH ANNUAL CONVENTION OF THE INSTITUTE OF APPLIANCE MANUFACTURERS AT CINCINNATI, JUDICIAL LO

appliances with timers, relays, solenoids, and electronic devices means that they can no longer be serviced properly by the average mechanic as in the past," Chapman said. "The service man of today must actually be a trained technician to do a satisfactory job of servicing appliances."

The success of any appliance manufacturer depends primarily, Chapman said, on three important factors: (1) a good product of proper design; (2) proper installation and initial adjustment; and (3) competent, efficient and economical service both in warranty and after warranty. In referring to warranty periods, he stressed the fact that the 90-day warranty of years ago was superceded by a one-year and then a three-year warranty and now, in many instances, by a five-year warranty.

ATI, JUDICIAL LOOK INTO MEETINGS, EXHIBITS, AND AT SPEAKERS AND CONVENTIONEERS.

Need to sell market

In a fast moving meeting, presided over by F. H. Guthrie, W. D. Miller, executive vice president of Robertshaw-Fulton Controls Co.; Melvin D. Verson, assistant sales manager, Verson Allsteel Press Co.; Robert Bartlett, engineering and production specialist, and C. F. Kent, sales manager, for Croname, Inc.; and Frederick H. Brooke, manager of Radarange Dept., Raytheon Manufacturing Co., the suppliers' part in major appliance sales, automation, printed circuitry and electronic devices was discussed.

W. D. Miller referred to the sizable and efficient engineering staffs of the many industry suppliers and the part they can play in assisting major appliance manufacturers to develop economical, efficient and salable new products.

Trend in automation

Melvin D. Verson presented an interesting film on "single press automation" and verbally referred to a recent trend to "multiple press automation." He pointed out that anyone using compound dies, progressive dies or automatic feeding equipment is utilizing automation. He also stated that 4,000 parts per day might be termed minimum production from a practical standpoint to warrant the employment of automated equipment.

C. F. Kent explained the manufacturing of printed circuits and displayed an interesting array of printed and etched circuits to demonstrate the method of manufacture.

Frederick H. Brooke reported that 2,000 electronic ranges have been made. He also referred to the remote possibility of electronic dishwashers, clothes washers, and other appliances, but called attention to their present high cost factors and much more development that would be required.

Hear Ford sales executive

At Tuesday morning's general session, *W. Frank Fisher*, retiring president of IAM, and vice president of John Wood Co., Bengal Range Div., served as first speaker on the program.

J. C. Doyle, general sales and merchandising manager, special products division of Ford Motor Co., whose subject was "What Is the Most Important Trait of a Good Manager?" delighted his audience by spending most of his time on problems of sales and merchan-

to Page 31 →

Exclusive feature finish

PLASTIC PARTS and components are marked in different ways. Printing is performed on plastic. Marking is sometimes done by the engraving process. In other cases, stamping is the method employed. Sometimes, manufacturers of plastic parts and components have printing done by contract, there being different firms engaged in such work.

There are variations in plastics printing procedures. Some plastics are soft or resilient to a point where they can be printed with impunity, using metal type. Where plastics are not sufficiently resilient to allow use of metal type, rubber dies or rubber type are sometimes used.

Printing methods used

Offset printing is used to some extent. The silk screen process may be employed, especially where more than one color is involved. Marking inks particularly for use on plastics have been developed, and their use is important.

One girl operator, *feeding a four-ton hydraulic press, now does the work formerly done by six girls, marking plastic control knobs for Nash-Kelvinator appliances. She places the knob blanks on fixtures mounted on a hydraulic index table, and works at position across the circular table from ram, where her hands are safe.*

Methods in use for marking plastic parts and components

a study of present methods used in marking plastic parts and components for the appliance and metal products industry with details on methods

Plastics can be marked where desired without use of ink, employing a branding or hot-stamping process. Electric branders are sometimes employed, depending upon the character of the plastic. Some firms specialize in hot stamping and inlaying into any plastic material. Others will print, engrave, or hot stamp plastic parts, as desired. Proper results in the branding or hot stamping of plastic calls for carefully following proved technique.

Using foil for marking

One interesting aspect of plastic marking is use of foil for the purpose, in connection with marking dies, in a press. Plastic marking foil is available in different places, and its use is definitely on the increase. Due to increased interest in marking plastics and other material with foil, some manufacturers of hydraulic presses have developed foil-marking accessories for their units. Presses for marking small plastic parts in this manner are usually provided with a dial feed.

In the past, compensation for non-uniform surfaces has been made by means of springs, so printing would be uniform regardless of slight variations in part dimensions. However, some of the better presses now used are equipped with a pressure reverse for the ram, so reversal will take place when pressure has built up to a given point, regardless of dimensions of the part. This allows perfect uniformity on marking and other delicate operations. One interesting instance of such marking occurred in the plant of a large appliance maker. Kelvinator was faced with a difficult proposition in marking plastic control knobs, used on appliances.

Originally, letters and numerals in the cast plastic knobs were painstakingly filled by girls using hypodermic needles. By this process, it was difficult to make markings uniform. The work was very tedious, and production was out of step with the rest of the plant's efficient operation. Later, the company turned from fully-molded knobs to molded plastic blanks.

Since the knobs now were not marked in the molding operation, the same basic knob could be used for different appliances. The idea was to mark different knobs according to their point of use. On the plastics used, an impactual blow of a marking die was not practical. Consequently, a hydraulic press was sought to do this work.

Provision for uniform pressure

A press was selected which had a ram on which force could be pre-set. That force could be imposed only after the ram had come into initial contact with the work. In this way, pressure is absolutely uniform on each stroke, regardless of possible variations in work dimensions. The dwell period on the press ram can be controlled easily. On this particular operation, a dwell of one-half second is used. The press employed is equipped with a foil-marking device, and with an index table. The index table operates in perfect time with the ram cycle, since power for the table is also derived from the hydraulic system of the press.

Once speed of press operation has been determined, the index table will feed at this precise rate. Molded plastic

to Page 96 →

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IAM MEET CONTINUED

dising. An inspiring speaker, Doyle's message was well received.

One interested listener described the Doyle message as follows: "In essence, he suggested that we appliance manufacturers spend less time worrying about the current picture in relation to sales, inventories, etc., and get out and do something about selling the market we know to be available."

The closing speaker for the morning session was *Martin R. Gainsbrugh,* chief economist, National Industrial Conference Board.

Tuesday afternoon's program included a gas heating division session headed by C. D. Allison, vice president, Dearborn Stove Company, and an oil division session headed by W. H. Hohmeyer, manager of sales research and promotion, Detroit Controls Corp. Most of the registered attendants not included in these sessions could be found on the display floors.

Tuesday evening was set aside for the annual reception and banquet of the Institute.

Kitchen planning session

J. H. Makemson, executive vice president, Geo. D. Roper Corp., headed a kitchen planning session on Wednesday morning which included John R. Doscher, executive director, Operation-Home Improvement; Carl Van Barton, Carlson's, Inc.; John R. McCord, director of public relations, Ferro Corp., and representatives of the National Institute of Wooden Kitchen Cabinet Manufacturers.

This interesting session covered such subjects as OHI (Operation-Home Improvement), profitable merchandising of complete kitchens, *color* in the appliance field, and standardization for built-ins.

John Doscher of OHI cited the *Look* survey which showed that 14 million home owners have planned one or more home improvements during the current year. He said that the remodeling market was estimated to be up 25 per cent, pointing out that lending by banks in California for home improvements is up from 20 percent to as much as 300 percent.

Referring to the statement by G.E. that the company will finance the entire kitchen or laundry instead of just the appliance, Doscher said, "*Every appliance dealer* can do the same thing with the aid of the local bank, lumberman and plumber — many of whom are on OHI committees." Doscher urged those not completely familiar with the Opera-

to Page 89 →

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A BETTER START FOR YOUR FINISH

Porcelain enameling aluminum at Cameo

complete details on material and metal preparation are included in this report on Cameo's modern facilities—range of applications discussed

by Gilbert C Close • *WESTERN EDITOR FOR FINISH*

Exclusive feature finish

A NEAT LITTLE BROCHURE distributed by California Metal Enameling Company, Los Angeles, answers all the questions normally asked by the average layman concerning porcelain enameled aluminum and its applications. It's a concise little booklet, simply written in the question-and-answer form, and it seems like it might have been turned out in a few hours by anyone well versed in the art of technical writing.

But this simplicity is deceiving. Actually, about four years of concentrated work went into the booklet's preparation. The typewriter didn't enter the picture until the last few days. The rest of the time was spent in laboratory research to gather and prove the factual data that it contains.

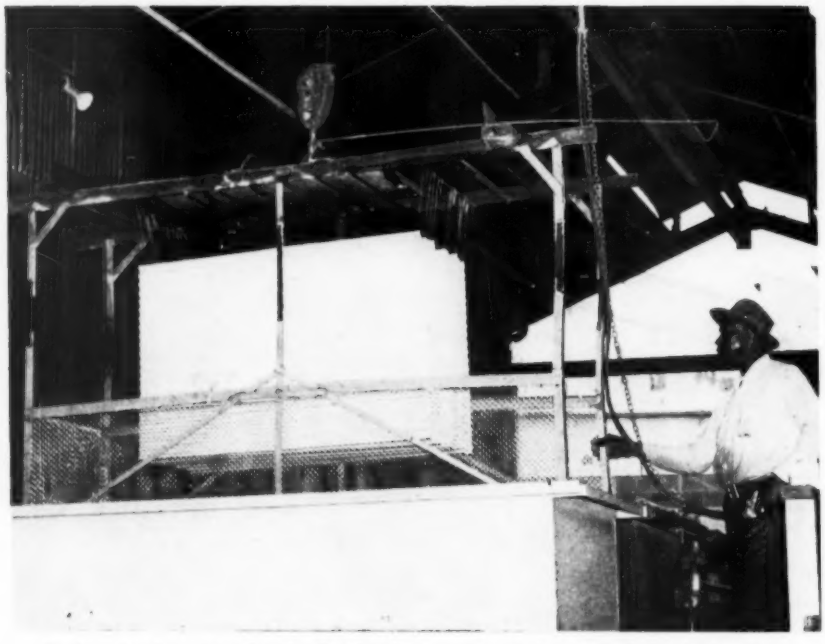
As one engineer at Cameo puts it, "if all the laboratory specimens used in this research work were laid end to end, they would certainly reach some newspaper's 'Believe it or Not' section!"

Result of long research program

But more than a booklet emerged from this intensive research program. Today, California Metal Enameling Co. is operating one of the nations finest and most modern facilities for applying porcelain enamel on aluminum. This facility is a direct result of the research program, and engineered in a manner to secure the same results that were obtained under precise laboratory control.

Wide range of applications

The work that can be turned out on the new line runs the gamut of practical and proven applications for porcelain enameled aluminum. It ranges from porcelain enameled architectural panels through a variety of signs, fixtures, kitchen and garden furniture, cook ware, instrument dials, and even light-weight aluminum name tags. The day this writer visited the plant, 16,000 sq. ft. of corrugated and embossed aluminum architectural panels were receiving a two-coat job. The panels will be used in erecting



***Drying tank** received a basket load of corrugated and embossed aluminum architectural panels which have been cleaned and pre-treated prior to enameling. Nine operations are involved in this phase of the process.*

CAMEO CONTINUED

a new service building for Lockheed Aircraft Corp.

The physical makeup of Cameo's new line for applying enamel on aluminum does not differ greatly from the lines used to apply porcelain enamel on regular enameling iron. First, there are facilities for cleaning and pre-treating the metal, followed in order by spray booths, a drying oven, and a furnace, all linked together by an overhead conveyor system. The line is laid out so that the work flows smoothly from start to finish, without in-process accumulations or the necessity of transporting in-process work from one location to another. The aluminum line is an entity in itself, and neither borrows nor lends facilities to or from any other line in the plant.

But similarity between the aluminum line an the other lines ends with the physical makeup. The solutions employed for cleaning and pre-treatment, the frits, the drying and firing temperatures, the time elements involved, and the quality controls employed, all differ in some degree from the same elements in conventional porcelain enameling work.

Before describing the new aluminum line in detail, Cameo engineers pointed out some of the special problems involved in applying porcelain enamel on aluminum. Selection of the proper aluminum alloys comes first. Alloys that are high in copper, zinc, manganese, and magnesium should be avoided. A high silicon contents seems to have less effect on enameling properties.

For some products, the final metallurgical condition of the metal (after the last firing) is important.

Importance of alloy selection

In this conjunction, it was pointed out that the heat treatable alloys (such as 61S), when received in the T6 condition, will end up in the T4 condition (slightly softer) after the final firing. However the T6 condition will gradually return as the material age hardens. The work hardening aluminum alloys such as 2S and 3S, will end up in the "O" or soft condition after the final firing. Furthermore, the work hardening alloys should not be fired more than twice, or hairlining of the enamel coating may occur.

The aluminum alloys commonly enameled at Cameo include 1100 (2S), 3003 (3S), 6061 (61S), and 6063 (63S). The numbers in parenthesis represent the now outmoded but generally best known alloy designations.

Thickness has no relationship

The thickness of the stock seems not to affect its enameling properties. Rolled sheet from 0.012-inch to 1/8-inch has been successfully enameled, along with aluminum foil ranging downward to 0.003-inch. Nor does the heat treat condition in which the alloys are received seem to affect enameling properties.

It was pointed out that proper material handling techniques are vitally important in enameling aluminum. The characteristic softness of the metal causes it to scratch and peen easily and the thinness of the applied porcelain enamel coating will not conceal these blemishes. Blows, abrasion, or a gouging action that would not affect ordinary enameling iron will ruin an aluminum product insofar as final enameled appearance is concerned.

It is well to point out here, however, that *after* the aluminum has been enameled, its resistance to mechanical surface injury is increased by about 60 per cent. Gloved handling of the material is necessary at certain stages of processing to avoid fingerprints that would show on the finished surface.

All forming done previous

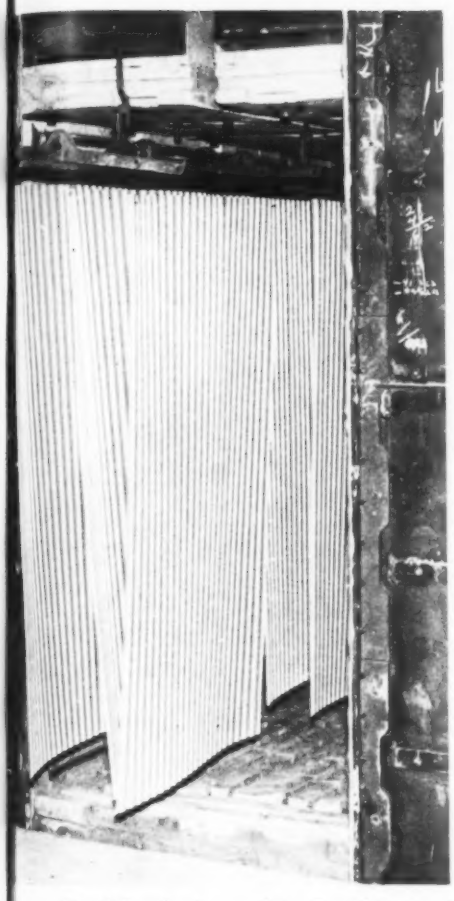
At California Metal Enameling Co., all major forming work is accomplished prior to enameling, usually on a press brake and minus any forming lubricants. Forming lubricants are usually not required to form aluminum, and would only add to the contamination of subsequent cleaning solutions. Hole punching, drilling, shearing and sawing can be accomplished after enameling without chipping or crazing along the edges of the cut. The raw aluminum sandwiches between the enamel coatings along these cuts is normally corrosion resistant and edge treatments after cutting are not necessary.

It is entirely possible to apply porcelain enamel over a weld bead in aluminum provided the proper welding rod is used for the alloy involved and that the bead is left in the "as welded" condition. Weld spatter must be avoided or cleanly removed.

Metal preparation program

In the Cameo production formula for porcelain enamel aluminum, nine specific operations are involved in metal cleaning and pre-treatment, applied in the following order: (1) clean in a chrome-inhibited, non-silicated, non-alkaline cleaner operated at 160 degrees F., and maintained at pH 8.3, (2) hot rinse at 180 degrees F, (3) caustic etch at 140 degrees F, (4) hot rinse at 180 degrees F, (5) de-smut at room temperature (a proprietary formula), (6) cold rinse, (7) chrome conversion coating (a proprietary formula), (8) cold rinse, and (9) dry at 190-20 degrees F.

The solution tanks employed are each



***Fired load** of porcelained architectural panels being withdrawn from six foot electric furnace. Firing time is 7-9 minutes with 5 minute period at 1000° F.*

10 ft. long, 3 ft. wide, and 5 ft. deep. Gas firing is used on the hot tanks. The de-smutter tank and chrome conversion tank are of stainless steel, while the others are made from ordinary mild steel sheeting. The tanks are arranged side-by-side on an elevated platform in a canopied building annex which provides good ventilation. Work is handled through the solutions in baskets by means of an overhead, split-track conveyor with hoist. After drying, the work is removed from the baskets and placed on an overhead conveyor for transport to the spray booths.

The solutions used in cleaning and pre-treatment are titrated at regular intervals, and additions are made as required to keep them at optimum operating efficiency.

The frits used at Cameo were developed in conjunction with a major frit supplier, and are now commercially available. The frits are ground until only a trace remains on a 325 mesh screen. This requires about 16 hours in a 150 lb. ball mill, and 18 hours in a 500 lb. ball mill. The ball mills are water-cooled by a constant stream of water while grinding. It has been found practical to prepare the frits several weeks in advance of their use. Then, just prior to use, they are thoroughly agitated and screened through a 120 mesh screen to remove any coarse material and assure thorough mixing.

Set-up of spray section

Two 6 ft. suction-type spray booths are in use. These side-by-side booths face in opposite directions so that when architectural panels are being sprayed, one booth is used to coat the front of the panel, the other the rear, while the panels continue straight through both booths on the overhead conveyor. Lacquer-type spray gun heads and tips are used, with a pot pressure of 12 psi. Frit coating thickness ranges from 0.003 to 0.005 inch.

From the spray booths, the work is conveyed into a continuous-type gas-fired dryer and dried at 160 degrees F. Drying is critical and should continue only until surface moisture disappears, not beyond. It has been found entirely practical to brush after drying though this operation is not usually required on architectural-type work.

Fire at 1000° Fahrenheit

A "batch-type" electric furnace is used for firing. Firing temperature is 1000 degrees F.—above the critical temperature of the aluminum alloys, but well below the melting point. The work is fired for five minutes after reaching temperature. This requires a total of from seven to nine minutes furnace time.

Strict quality controls necessary

Cameo engineers point out that the same troubles are liable to occur when firing over aluminum as when firing over conventional enameling iron. The only way to avoid them is strict quality controls and process controls at all times. Dirt, metal impurities, solution deficiencies, careless handling, improper temperatures, etc., must be rigidly avoided.

The brochure mentioned at the beginning of this article points out many factors concerning porcelain enameled aluminum, all based on extensive laboratory research. The enamels used on aluminum are of either a lead oxide or phosphate base. The lead oxides are used for decorative, industrial and corrosion resistant finishes, and the phosphate based types are used where the enameled coating will be in direct contact with foodstuffs.

It is perfectly practical to enamel aluminum alloy castings, provided the castings are essentially free from porosity and sand holes which would cause irregularities on the enameled surface. Permanent mold castings are preferred because of their freedom from these surface defects. Casting alloys 43 and 356 are particularly adaptable to enameling.

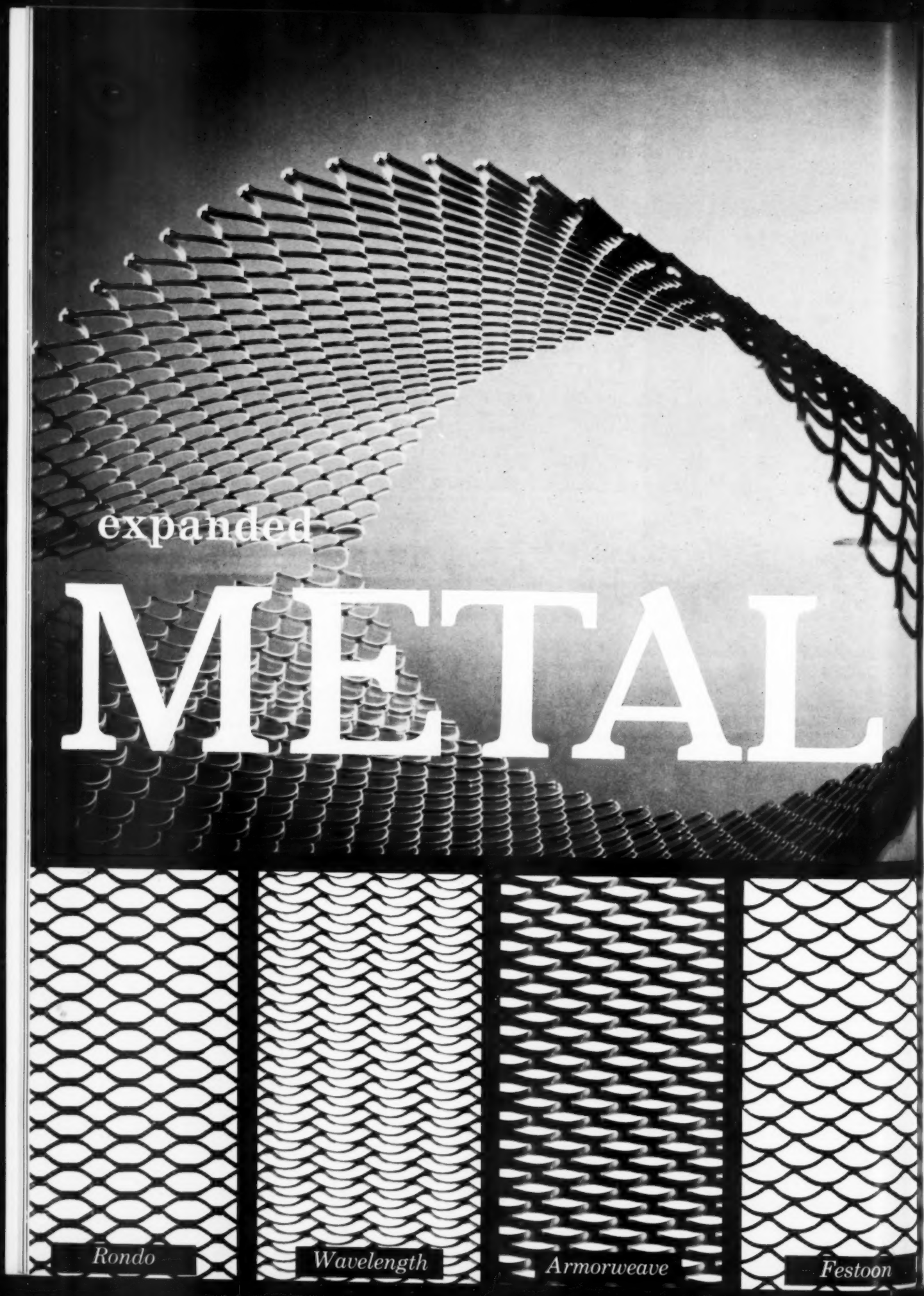
A porcelain enamel coating on aluminum is highly resistant to thermal shock. A coated sheet heated to 1000 degrees F. may be plunged into cold water without detrimental effects. And, of course, the coating is fireproof and will not add fuel to a conflagration. Welding can be accomplished after enameling. and if proper care is used, an enameled sheet may be heated and welded on one side without discoloration of the enamel on the other side just opposite the weld.

Full range of colors available

A full range of colors is available, ranging from full matt to high gloss. Many variations of surface texture can be obtained by using special spraying techniques, or applying the porcelain enamel over the various embossed types of aluminum. The thinness of the vitreous coating permits it to follow the embossed design with a high degree of fidelity.

These characteristics, coupled with the lifetime color stability of porcelain enameled aluminum, and its light weight which pays off in many ways — structural, shipping, handling, etc. — undoubtedly earmark it for a brilliant future in the architectural, industrial, and commercial fields, Cameo engineers believe.

***Accelerated spalling test** in a 5% solution of ammonium chloride is given each batch. Coatings are inspected after 24 and 96 hours of immersion.*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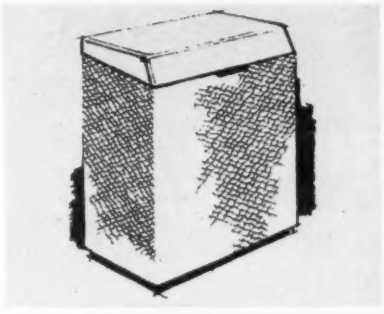

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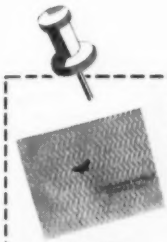

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Yes, stainless steel can be etched

methods for use in etching outlined with details on solutions and obtainable results. Electrolytic method has many values.

by W. E. McFee, • *SUPERVISOR, PRODUCT INFORMATION SERVICE, ARMCO STEEL CORP.*

ETCHING is a specialized field, but satisfactory work can be done on stainless steel with relatively little equipment and experience.

Just a few of the applications for etched markings and designs are nameplates, measuring instruments, decorative panels and similar parts. Response to the etching solutions depends upon the type of stainless steel, temperature of the etchant, and time of treatment.

These are the solutions that are being used on stainless steels: (1) 10% Nitric Acid + 4% Hydrofluoric Acid at 130-140 F, (2) 12% Nitric Acid + 5 or 6% Hydrofluoric Acid at 130-140 F, (3) 625 Fe Cl_3. $6H_20$ + 44 grams NH_4Cl — dilute to 1 liter.

Solutions 1 and 2 will develop a light etch in 15 minutes to one hour. However, they are not well suited for most production runs. No. 3 produces a fairly deep etch in about one hour at room temperature.

Details on electrolytic method

This electrolytic method of etching is recommended for rapid production of deeper etches: (1) Mask the entire surface of the work with a clear lacquer and cut out or otherwise remove the lacquer over the areas to be etched. If even better quality work is desired, photo-engraving or the silk screen process may be used. In photo-engraving the design is photographed directly onto the work surface after applying a light-sensitive coating. Areas not to be etched are hardened by exposure to light; then the unhardened areas to be etched are washed off. In the silk screen process the screen is used as a template and coating is applied only to areas where etching is to be done.

(2) When the metal has been masked, place over the area to be etched an absorbent electrical non-conductor soaked in an acid electrolyte. Blotting paper is a simple, easily obtained material for this purpose. A 12-15 per cent solution of hydrofluoric, sulfuric, nitric or phosphoric acid produces a dull, frosty etch when used with comparative low current densities. (Ed note: Do not use nitric acid on absorbent paper).

Voltage depends on size of work

(3) Place a strip of metallic conductor over the acid-soaked absorbent strip. Connect the work to the positive terminal of a d-c power source, and the metal strip to the negative terminal. From 2 to 12 volts are required. The larger area to be etched out, the higher the voltage and total current must be. Small areas are etched in from 5 to 30 seconds; larger areas may take from 30 seconds to several minutes.

Adaptable to high production

The electrolytic method of etching is simple, economical and can readily be adapted to high production. For example, surface prepared strip may be drawn slowly through flat electrodes to achieve continuous operation. Use glass cloth, asbestos paper or cloth, or thin sponge rubber to carry the electrolyte. These absorbent materials will last longer under the abrasive action of the moving strip. Sponge rubber should not be used with the nitric acid solution.

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tests have proven that 201-202 stainless has superior properties over equivalent types in 300 series. Increasing use by appliance and allied fields noted. Predict tremendous growth in use in '56.

A NEW low nickel alloy stainless steel is drawing national attention in the face of a continuing nickel shortage. To meet customer demands for more stainless steel in both consumer and industrial products, many fabricators are now using, or have under test, Type 201 and 202 stainless steel, the new low nickel, high manganese alternates to conventional austenitic types. Requiring less nickel, these new grades represent one solution to the dilemma of meeting increased demand for austenitic stainless steels in the face of a continuing nickel shortage.

Background of nickel controls

The first major use of low nickel, manganese steels came with World War II and the production of an alloy containing 17% CR, 4%Ni, 4% Mn. This alloy was used largely in the transportation field but presented some difficulty due to breakage in cold forming operations which was associated with the high work hardening rate of this particular composition.

During the Korean Emergency, NPA order M-80 limited the use of nickel in most civilian goods to 1% maximum. This resulted in the production of a stainless alloy nominally composed of 15% Cr — 1% Ni — 17% Mn. Although the mechanical properties of this steel were comparable to those of AISI Type 301, it did not approach the standard grade in corrosion resistance or hot working characteristics. Today, however, alloys of this general composition, with higher nitrogen contents are under study and show a great deal of promise in offering satisfactory corrosion resistance and workability.

Developments of new types

The new AISI types are a direct outgrowth of previous experience with low nickel, high manganese steels. They are evolutionary, not revolutionary and have a background in production and service which offer the metalworking industry alloys of merit with wide possible application. These are the first of the low nickel, austenitic stainless steels to be recognized by the industry and as such are a new family of stainless steels — not merely substitutes designed to meet an immediate emergency.

Plan substantial increase in use

Production of 201 and 202 stainless during 1955 amounted to less than 2,000 tons. A recent survey of producers and fabricators, however, indicates that during the current year substantial quantities will be used by many American industries. Some industry leaders have said that they expect this growth trend to continue to the point where ultimately these types will replace up to 80% of the higher nickel Types 301 and 302.

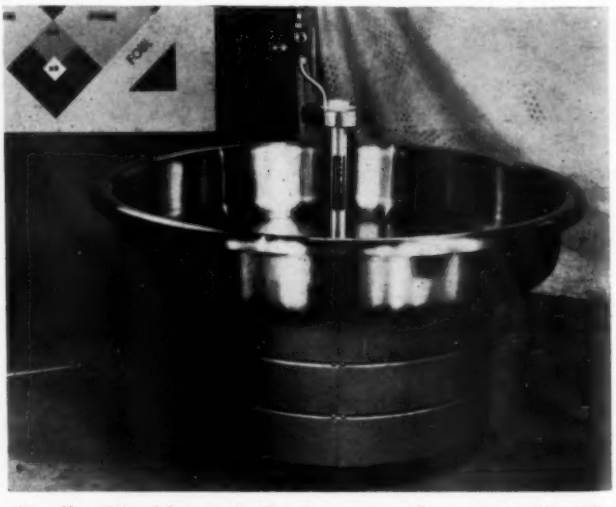
This is an expectation closely tied to estimates of the future availability of nickel since austenitic stainless steels consume 1/5 of U. S. nickel production. And while nickel production is constantly increasing, production increases in stainless have been substantially higher. Other demands on nickel have also been on the increase as equipment operating temperatures rise.

Superior properties revealed

The physical and mechanical properties of the two new types are very similar to those of the equivalent higher nickel Types 301 and 302. Yield strength, ultimate tensile strength and hardness in the annealed condition are higher, but not of sufficiently greater degree to seriously affect production practices. The work hardening characteristics of the newer grades also conform to known rates for similar austenitic types.

In high temperature tests, the 200 series has exhibited properties superior to equivalent types in the 300 series, rupture strengths of Type 201 comparing favorably with Type 347 and superior to Type 304. Similarly, short time elevated temperature properties are con-

Bloomfield Industries, *Inc. uses 202 stainless for malt cups and similar pieces. Formerly 302 was used, but the change to lower nickel alloy required no process changes.*



Bradley Washfountain *Co. has reported no noticeable differences between 202 and 302 stainless throughout all operations including drawing, curling, polishing, welding.*

Bradley Washfountain *bowls are drawn to size in a single draw from .095" stock. Blanks for 36" bowls are 48" dia. Replacing 302 stainless, there were no production changes.*

Tuttle & Kift, Inc., *Chicago, has made extensive tests on 201 as alternate to 301 for burner rings and supports. Initial blanking and drawing (as shown here) is followed by redrawing, blanking and the regular polishing operations.*

siderably higher than those of the comparable types in the 300 series.

The scaling resistance of the Cr-Ni-Mn steels is equivalent to that of types 301 and 302 up to approximately 1500° F. At higher temperatures scaling proceeds more rapidly, to the extent that recommended annealing temperatures are 50° to 100°F lower than those used for higher nickel types to prevent difficulty in pickling.

Corrosion resistance

Uppermost in the minds of fabricators who have turned to Types 201 and 202, is the corrosion resistance and service life which can be expected from these materials.

No difficulty is expected in atmospheric corrosion since Cr-Ni-Mn steels have been in service for fifteen years without any evidence of corrosion due to normal atmospheric conditions or common cleaning solutions. The Budd Company, Philadelphia, Pa., first constructed rail cars and truck trailers using a 17-4-4 composition in 1942. All of the units produced have seen constant service, and that company has standardized on the use of Type 201 where Type 301 was previously used.

Similarly, International Nickel Co. has conducted exposure tests for fourteen years, subjecting samples to the industrial atmosphere of Bayonne, N.J. In both open and sheltered exposures there was no significant difference between Cr-Mn, Cr-Ni-Mn-Cu and Types 302 and 304 during the test period.

In marine atmosphere tests Cr-Ni-Mn samples were comparable, in appearance, to 18-8 Cr-Ni samples after 9 years exposure. No decrease in tensile strength, yield strength or elongation occurred as a result of this exposure.

In general, the corrosion resistance of Types 201 and 202 stainless closely approximates that of Types 301 and 302. To date, every test application of the Cr-Ni-Mn steels has proved satisfactory in such uses as home cooking utensils, sinks, restaurant equipment, transportation equipment and architectural. There is no indication that these steels will be limited in their replacement of Types 301 and 302 in any application where the latter steels are being properly used. While they are not generally recommended for Type 304, there may be instances where steel specifications are "over-alloyed". In these cases, the low nickel, austenitic types may be able to perform satisfactorily.

Fabrication of Type 201 and 202

In draw bench forming, roll forming and brake bending operations, Types 201 and 202 can be handled in exactly the same manner as 301 and 302 respectively. The Budd Company which uses draw bench forming extensively with some brake bending and shallow drawing has found no difference at all between 301 and 201. Operators have been unable to distinguish the two types when they were intermixed in normal production.

In both shallow and deep draw applications, The Cr-Ni-Mn types have behaved almost identically to their Cr-Ni counterparts with, however, some important exceptions. Usually, hold down pressure must be adjusted to prevent wrinkling which might occur due to the higher yield strength. Since blank holding or hold down pressure is a variable factor with almost every part produced, it is neither necessary nor desirable to offer any specific recommendations on this point.

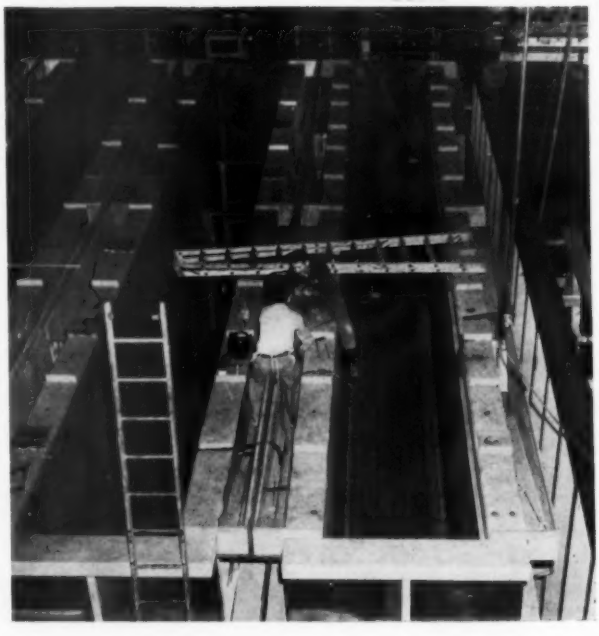
No re-tooling necessary

The production operations examined to date show that fabricators can turn to Cr-Ni-Mn stainless steels without any additional investment in tooling and possibly at a savings in certain operations. Draws up to 36" in diameter by 10" deep are being made without any difficulty.

Other routine operations covered in a recent survey where no noticeable difference in Cr-Ni-Mn and Cr-Ni steels could be found include simple machin-

to Page 76 →

Material for this report was provided by the Committee of Stainless Steel Producers of the American Iron and Steel Institute.



Exclusive feature finish

OVERALL VIEW of the new Douglas metal cleaning and treating system is shown in the above photo, representing some 8400 square feet of floor space. Construction shot is given to provide an idea of tank size and depth of what is said to be the world's largest metal cleaning and treating installation.

Practical innovations high-light West Coast metal treating system

a huge system loaded with applications that can be adapted to small shops. System cut labor cost 80 percent over former methods.

THE new metal cleaning, anodizing and Iriditing installation placed in operation recently at the El Segundo Division of Douglas Aircraft Co. could bid for attention on its size alone. A recent survey indicated that it is the largest such installation in use in the aircraft industry, which undoubtedly places it among the "biggest in the world" category. But a visiting engineer would soon lose interest in its size and find himself concentrating on the many individual features which have been engineered into the system to improve its operation and flexibility from the time the parts are racked, until they are cleaned, surface-treated, and ready to go.

The point is this . . . Many of these "individual features" could be engineered into new or existing similar systems regardless of their size or location, and would improve the operation of that system accordingly. Their current association with a "world's largest" system implies no limitation on their use in smaller, less complex systems, or in industries far removed from aircraft production.

Size of individual units in system

But to return to size for a moment, here are some figures that only an experienced plant engineer will fully appreciate. The system is comprised of 12 solution tanks and a tank-type drying oven, each 42 ft. long, 12 ft. deep, and 4½ ft. wide. It covers 8,400 sq. ft. of floor area. Each tank has a capacity of 16,000 gallons, adding to a grand total of 192,000 gallons for the system. Gross weight of the system is 2,240,000 lbs. Twenty-five electric motors totaling 290 h.p. are used to power it. Heat requirements total 19,500,000 B.T.U. an hour, enough to heat 450 average 3-bedroom homes in wintertime.

Two deionizers deliver 20,000 gallons of demineralized water between regenerations at a flow rate of 3000 gallons an hour; and two water softeners deliver 50,000 gallons of softened water between regenerations at a flow rate of 3000 gallons an hour.

Charging the tanks requires 16,000 lbs. of soap for the two soap tanks, 7000 lbs. of solid dry acid for the chromic anodic tank, 8000 lbs. of solid dry acid for the Iridite tank, and 18,000 lbs. of solid dry acid for the de-oxidizer. Sewage from the tanks can be treated 20,000 gallons at a time through a 1200 gallon tank containing an acid-neutralizing caustic.

Water softeners set-up at Douglas

Two 50,000 gal. water softeners are used on the Douglas El Segundo Anodic System. Those softeners are used alternately, one in use while the other is being regenerated. This assures an uninterrupted supply of soft water at all times. Signs on the softeners indicate which one is in use at the time, and whether the one not being used has been regenerated and is ready for the switch-over.

The softeners supply water for all the cleaner tanks and for all the rinse tanks except the final Iridite rinse tank.

Two 30,000 gallon de-ionizers are in use, each de-ionizer consisting of two tanks — one for sulphuric acid, the other for a caustic, to provide the anion and cation respectively. One de-ionizer is used while the other is being regenerated, and signs indicate the use status of either at all times. A Solubridge is installed to keep a constant check on the water hardness leaving the de-ionizers. This is usually kept at about 3 grains of hardness.

De-ionized water is used for all the chemical solution tanks, and for the final Iridite rinse tank. The anodic sealer tank (water only) contains de-ionized water at 220° F.

Outstanding engineering on fume control

The tanks are ventilated by air drawn through slots around the brim of each. The ventilating exhaust fans handle 270,000 C.F.M. of air, enough to effectively "air condition" the building space surrounding the system. This ventilating system is so effective that there is no noticeable odor anywhere along the catwalk surrounding the tanks. Fumes and steam rising from the hot tanks are effectively confined by the downdraft to the level of the ventilating slots. To comply with the now famous Los Angeles "smog" requirements, all acid tanks have water absorption fume separators on their exhaust.

So much for size. Now let us concentrate on the various operating features of this huge installation which, in scaled-down proportions, are entirely applicable in principle to systems of much smaller size.

First — material handling during treatment. Parts to be cleaned and anodized are delivered to a specific area at one end of the system by the method most applicable to their handling. Some of these parts, such as wing spars and airplane skin sections, are very large and defy routine mechanized handling. Parts to receive the Iridite treatment are delivered to an area at the opposite end of the system by a plant-wide, conveyorized basket delivery system.

This original separation of parts to receive two different treatments has several advantages. It eliminates entirely the chance that a part will receive the wrong treatment; it erases all doubt in the minds of those loading the parts for treatment, and speeds their work accordingly; it simplifies crane handling of the racked parts through the various treatment tanks, for when the crane operator picks up the load, the location of the pick-up tells him immediately into which tanks the load must be immersed.

Handling of materials during treatment

Two 20 ft. tramrail cranes are available for handling the work through the system. Each crane is operated from its own cab by a system of fully automatic push button controls. The crane tracks parallel each other above the tanks. In the normal course of operation, each crane handles its own work through the system, using only half the length of the 42 ft. solution tanks into which to immerse its load. Thus one crane may be handling parts for Iridite treatment while the other is handling parts for anodizing. They can bypass each other at will while handling their workload through the various solutions, or both cranes can be using the same tank at the same time without interfering with each other.

This crane system layout has two distinct advantages. First, as already noted, both Iridite and anodizing work can be ac-

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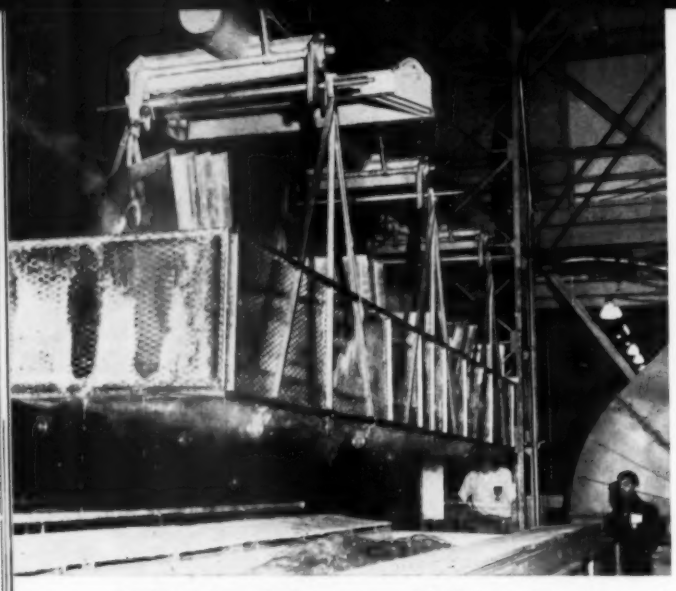
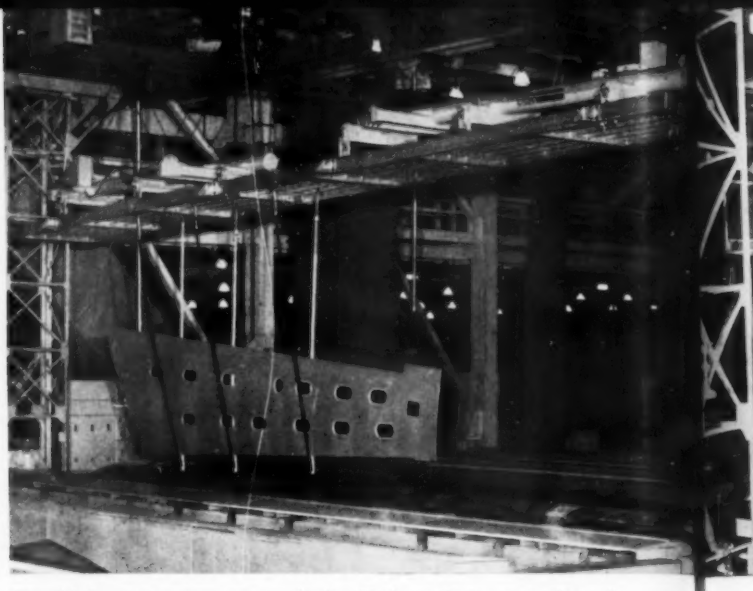
Pneumatic electric *contact system for anodic tank which utilizes up to 6,000 amperes is shown in below photo at center. Grid extension, riveted bar at upper center, fits into the automatically closing clamp and then current is applied.*



Basket of work *being crane-lifted from hot rinse tank shows how overall downdraft of air pulls steam downward toward the tank ventilating slots.*



Combining two cranes, *a single 40 ft. unit is created to do movement handling of one large airplane skin section shown. When cranes are combined, a single operator handles the job.*

Full control *of operation is provided the crane operator. Two small levers, a series of push buttons and external push buttons, all in reach, control the entire processing operation.*

PRACTICAL INNOVATIONS CONTINUED

complished at the same time, or in the event of a heavy workload for one type of treatment, both cranes can engage in the same type of work. Secondly, when very large workpieces must be treated, such as wing spars or skin sections more than 20 ft. in length, the two cranes may be both mechanically and electrically locked together to form a single crane spanning the entire 42 ft. tank length. When locked together, the two cranes operate as a single unit and are controlled from one of the cabs.

Simplify teaming up of individual cranes

Even the task of locking the cranes together has been greatly simplified and can be accomplished in a matter of seconds. Whenever they pass each other on the parallel tracks, a light bulb flashes. The flash of this bulb indicates that the two cranes are in the correct position for joining together. The operator merely touches a push button to complete the job. Another push button disjoins the cranes so that they may go their separate ways.

Tri-point workload suspension is used on both cranes. This stabilizing feature eliminates all basket or workload sway, and when the crane is stopped, the operator does not have to wait for the workload to quit swinging back and forth before he lowers it into the tank. This one feature plays an important role in speeding up the work and preventing injury to the parts and workbaskets.

The hooks on the crane that pick up the workload are electrically actuated and controlled by a push button in the cab. Another advantage is that the crane lift mechanism may be controlled in a manner to tilt the workload endwise as it is lifted from a solution tank. This speeds drainage and minimizes solution carry-over.

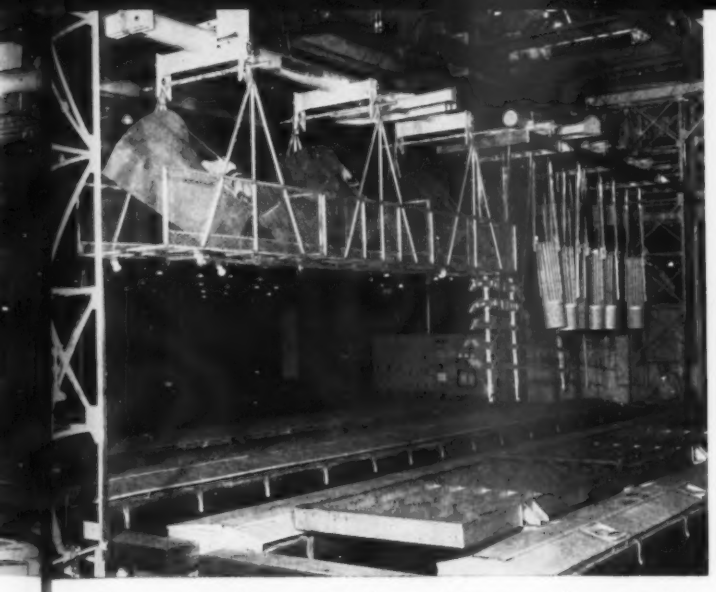
The company-engineered workbaskets themselves contain several worthwhile innovations. They are made entirely from stainless steel, and are mounted on eight stainless steel casters so that they can be moved about easily on the plant floor when detached from the crane hooks. Each caster is provided with a chemically resistant Teflon bearing which is not affected by any of the solutions in use.

Cycling current through anodizing tanks

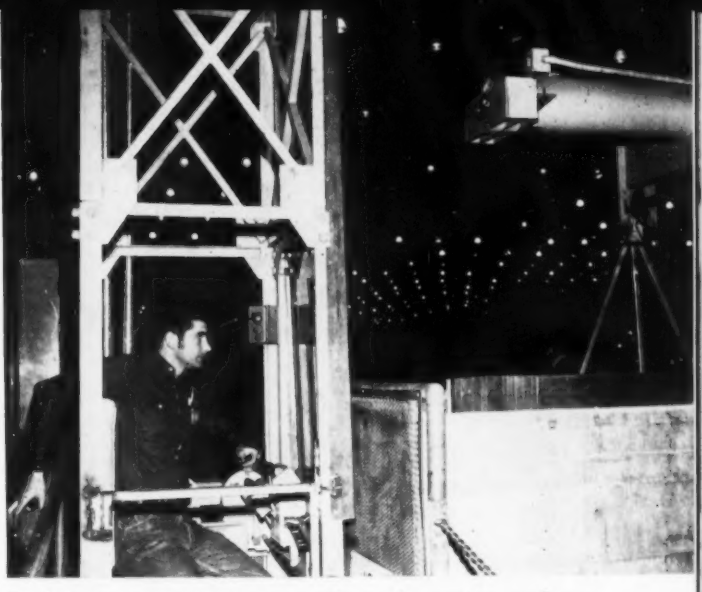
The body part of the baskets is made from expanded stainless steel mesh. The framework is of formed, open-sided stainless steel tubing. This open-sided tubing permits complete drainage and helps to minimize solution carryover. Each basket is 20 ft. long, 4 ft. wide, and 5 ft. deep, measuring up to its suspension bracket and each is provided with a system of retractable brackets which, when extended, permit hooking of two baskets together, one over the other, thus doubling the capacity of the workload. Special stainless steel racks and workholders are provided for parts not adaptable to basket loading.

Another feature of this huge metal treating system that is adaptable to smaller systems is the provisions for handling the electric current through the anodic tank. Here again automation prevails. A push button sets the anodic cycle in operation; an automatic timer shuts it off. What happens in between is automatically controlled.

A 5 to 40 volt, 6000 ampere, 3-phase full-wave rectifier, controlled by a static magnetic amplifier, is used. The rectifier



Crane operation *set-up allows different working schedules. Here, the two 20 ft. cranes, each with own operator, pass each other. Note that each crane is loaded with a different type job.*



Tank-type over doors *are used in the section and are operated pneumatically with push button control. Operator reached outside cab to activate the clam-shell type door.*

operates in conjunction with the automatic process programming. The operator has only to push a button and the rectifier goes through its cycle, rising from 5 volts to 40 volts within 8 minutes, then holding at 40 volts (plus or minus 1%) for the pre-set time, usually 30 minutes, but adjustable for from 20 to 60 minutes. Cut-off is automatic, and a horn sounds to let the crane operator know that the process is finished. All push buttons on the control panel for the anodic tank can be reached from the crane operator's cab.

Method for suspension of parts in solution

A new system was worked out for suspending the parts in the anodic solution and assuring optimum electrical contact with minimum current losses. Special aluminum grids were designed (see photo) from which the parts are suspended. The anodizing current is fed into this grid from one end. Contact between the grid and current supply is accomplished by a pneumatically actuated clamp which closes automatically on an extension from the grid when it is lowered into place on the anodic tank. When the anodic cycle is completed, this clamp opens automatically to interrupt the current supply.

This contact system eliminates entirely the "hodge-podge" harness of electrical conductors usually found on an anodic system, and simplifies the process accordingly. While the aluminum used in the grid structure has only about 60 per cent of the conductivity of copper, it has a much greater stiffness vs weight ratio, therefore an increase in cross sectional area to offset the lower conductivity is more than compensated in overall weight saving.

The tank-type drying oven located at one end of the system has interior dimensions the same as those of the solution tanks, but the oven was recessed into a 4½ ft. deep pit so that when its clamshell doors are open, they are on a level with the tops of the solution tanks.

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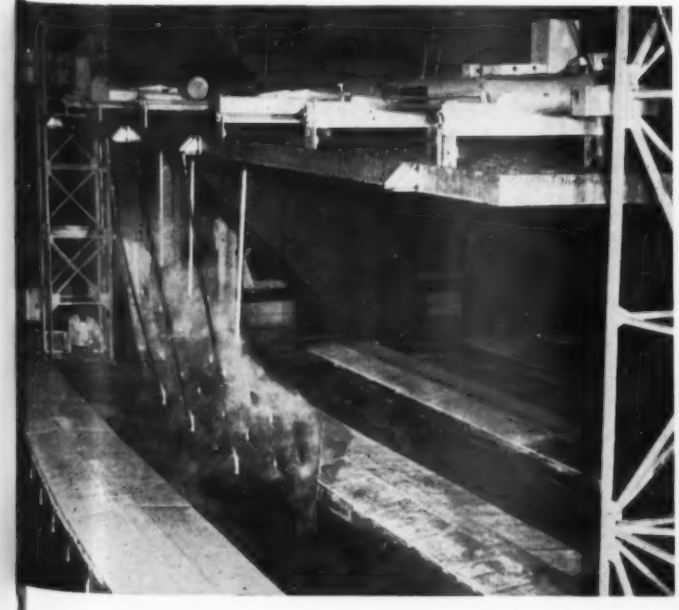
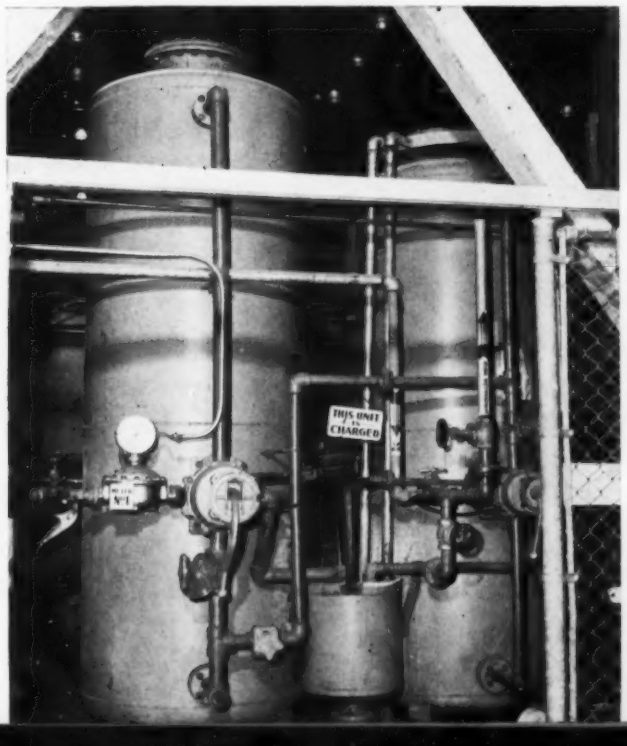
Eliminating the old *harness contact system, this current carrying aluminum grid in use suspends parts in the anodic tank*

All photos courtesy of El Segundo Division of Douglas Aircraft Co.



De-ionizer units *used in system are shown here. One tank contains sulphuric acid, the other a caustic to produce the anions and cations. System capacity is 30,000 gallons.*



Water Softener And Deionizer Equipment Plays Important Part In Metal Finishing At Douglas Aircraft El Segundo Division

Deionized water is used in the Iridite tanks and for the final rinses in the metal finishing department of Douglas Aircraft, El Segundo, California, the largest such installation in use in the aircraft industry. Zeolite softened water is used in the alkaline cleaner tanks and to regenerate the anion exchange units of the deionizer equipment.

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PRACTICAL INNOVATIONS CONTINUED

Thus the crane operator does not have to adjust the height of the workload when he moves it from a solution tank into the oven. The pneumatically operated clamshell oven doors are opened by a push button which the crane operator can reach from his cab. Push buttons are located at each end of the oven so that either crane operator can open the doors.

Four 6-inch gas burners provide oven heat at the rate of 2,600,000 B.T.U. per hour. Oven temperature is maintained at 200 degrees F., plus-or-minus 10 degrees F. The hot air volume in the oven is changed 20 times a minute by a fan system driven by a 40 h.p. motor.

The tanks are of all-welded construction, utilizing ⅜-inch thick steel plate. Exterior verticle 12-inch "U" sections spaced at 3 ft. intervals provide the necessary tank wall stiffness. If it ever becomes necessary to lengthen or shorten the tank structures, it can be easily accomplished in increments of these 3 ft. sections. The Iridite and de-oxidizer tanks are lined with 3/16-inch Koroseal. The Iridite and de-oxidizer rinse tanks are lined with a catalyzed phenolic material. Stainless steel liners are used in the tanks containing deionized water. The six rinse tanks in the system are each provided with a full-length skimming sprayer and skim dam.

Installing spray-rinse on one tank

One of these rinse tanks is currently being renovated into a spray-rinse for parts that have received the Iridite treatment. One tank, containing deionized water at 200 degrees F., is used as an anodic sealer. Anodized parts are transferred to this tank immediately after anodizing to "set" and enhance the general quality of the anodic coating.

As already noted, the volume of air being drawn through the ventilating slots that surround each tank brim perimeter is so great that a general downdraft is created over the entire system. This prevents any odors or fumes whatsoever from escaping into the plant area. Even when racked or basketed parts are crane-lifted to a considerable height above the tank surface, the downdraft causes all steam and fumes from the surface of the suspended parts to be sucked downward into the ventilating slots.

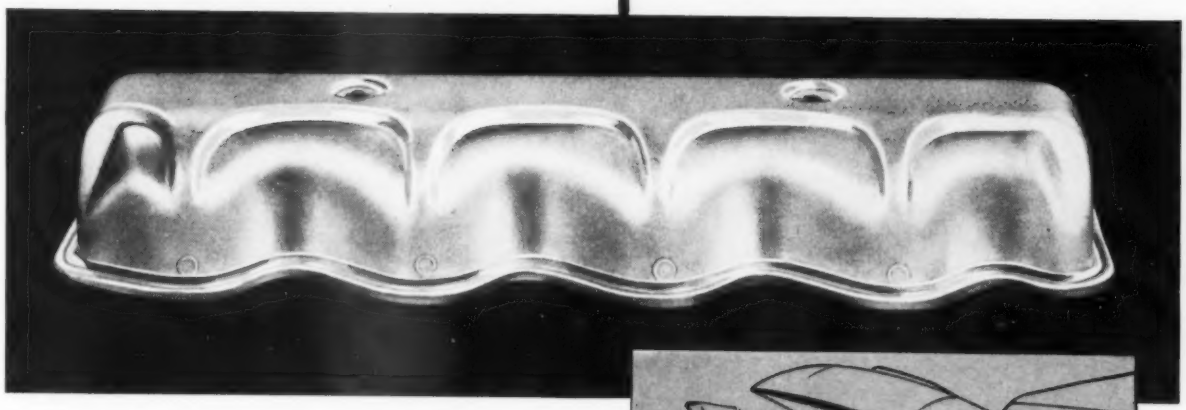
To summarize briefly, it might be said that the new Douglas metal cleaning and surface treating installation is a long step toward automation of a process wherein numerous parts of different sizes must receive different treatments. All system controls have been designed to the push button stage. The same applies to all material handling activities. A minimum of human decision is required to operate the system. Prior segregation of parts to receive different treatments, the stabilized tramrail cranes, and the simplicity of scheduling a workload through the solutions after it has been picked up, reduces employee experience requirements.

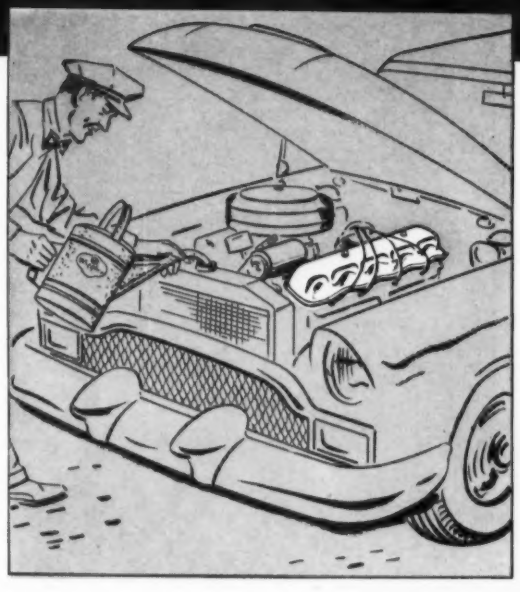
New equipment greatly reduces labor cost

As a result of these carefully engineered improvements and innovations, most of them applicable in principle to any metal cleaning and treating system regardless of size, *five times as much work of more assured quality is turned out per employee than was turned out on the old system it replaced.* The cost of cleaning and chemically treating the metal in a typical airplane skin has been reduced from about $12,000 to around $5000. Thus a single job provides substantial amortization for the $450,000 investment.*

*Cost of the new system (approximate).

Our challenge stands—





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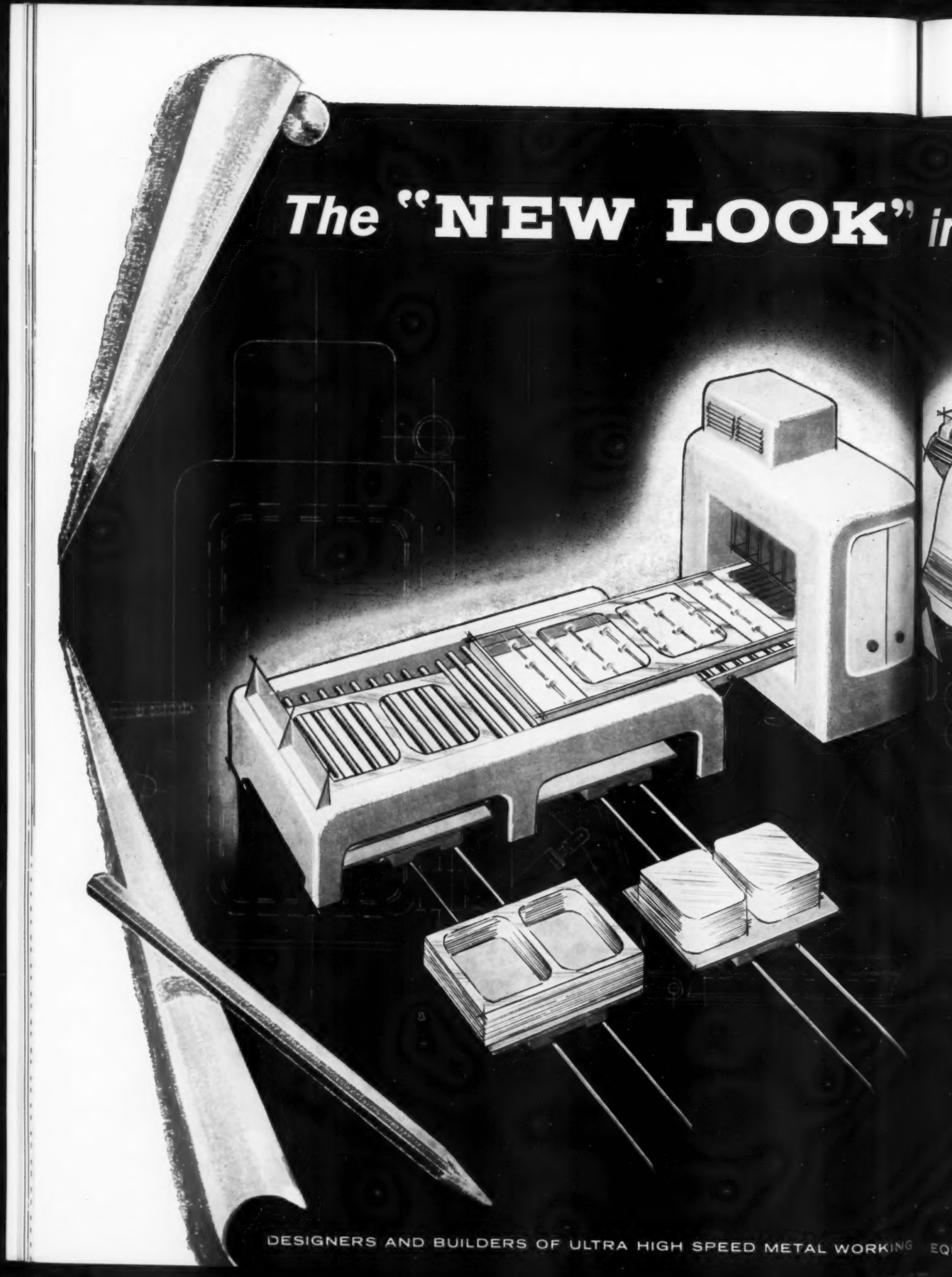
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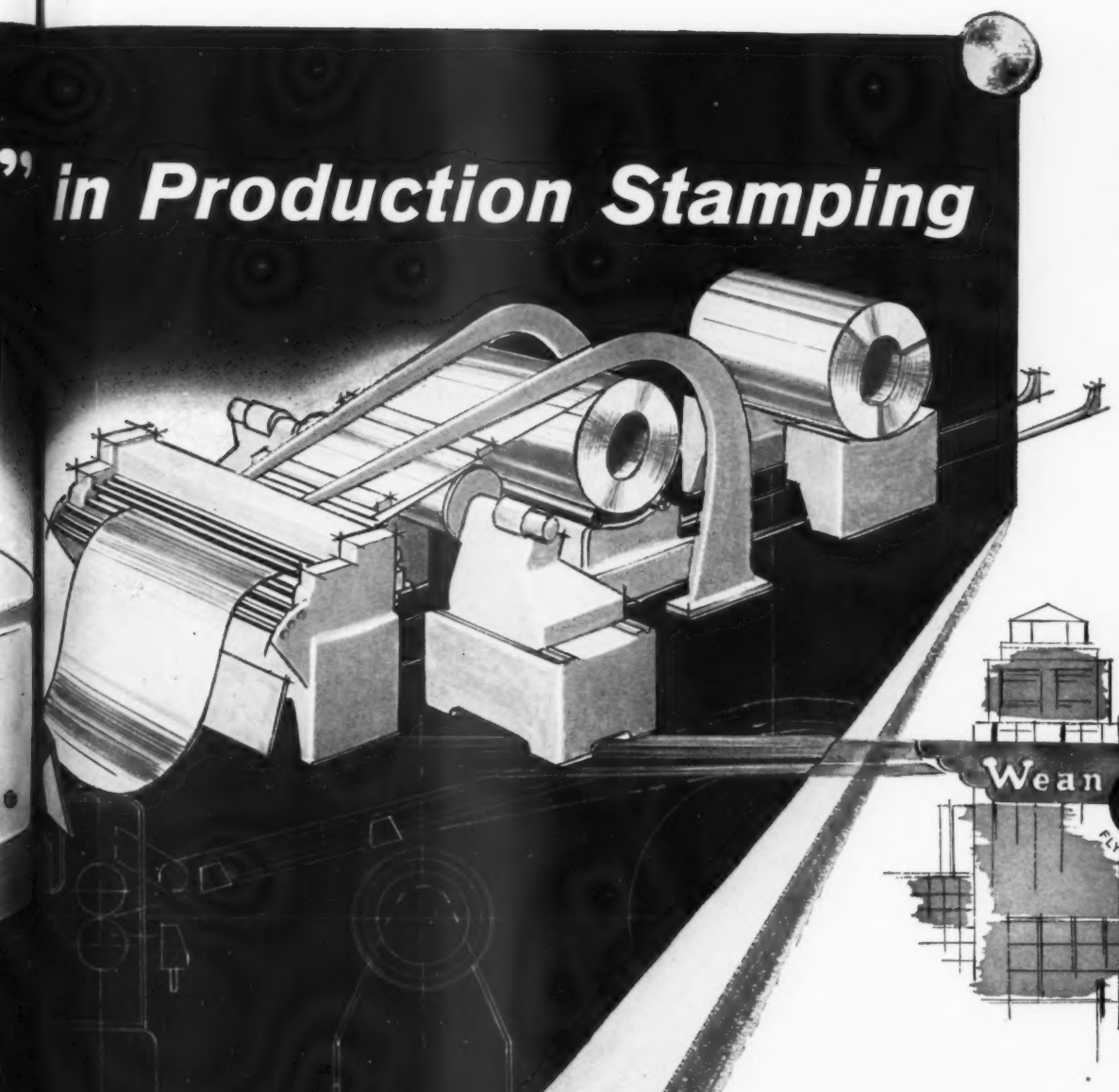

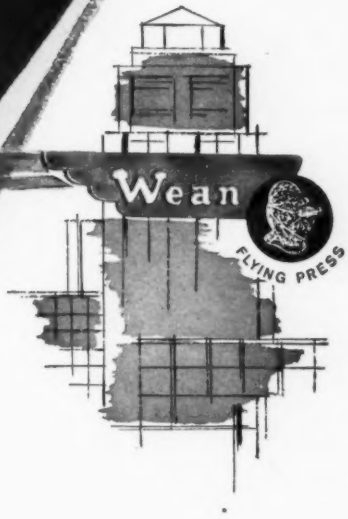

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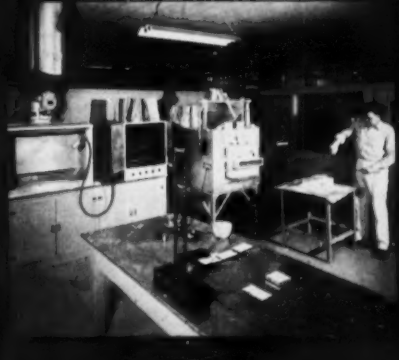
Porcelain Enamel is Sanitary and Easy-to-clean.

for STEEL KITCHEN CABINETS
Porcelain Enamel is Beautiful and Never Fades.

These characteristics--



VENDING MACHINES—

Porcelain Enamel is easier to clean...resists rough treatment.

Entertaining and educational movie in color and sound—shows how quality control is used in the manufacture of frits and colors . . . how ceramic finishes help sell products. AVAILABLE FREE.

PEMCO CORPORATION
BALTIMORE 24, MD.

Please send us a print of the film, "Everything Under Control" for our showing (State preference) on:

1st Date.....

2nd Date.....

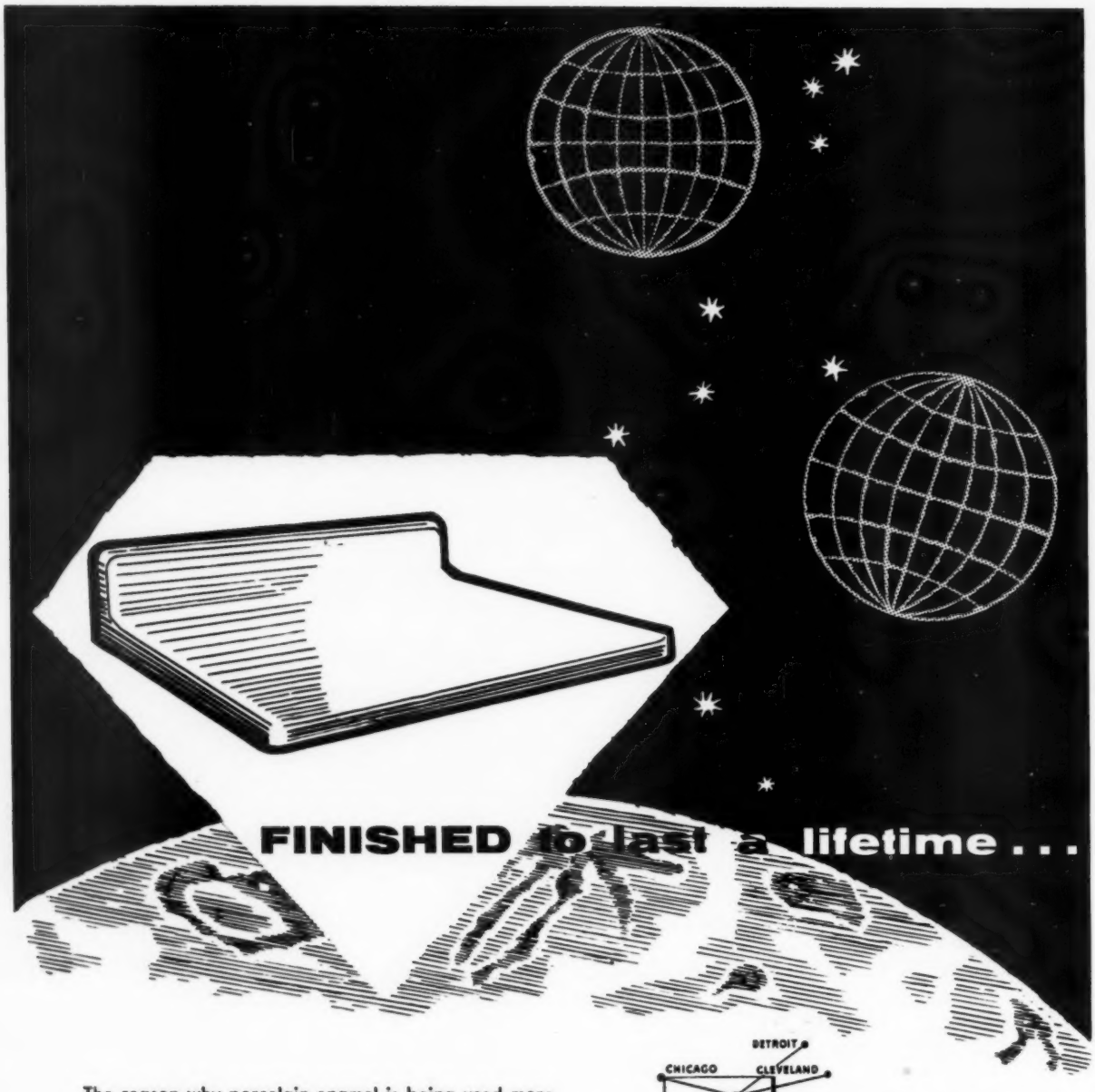
3rd Date.....

NAME..... TITLE.....

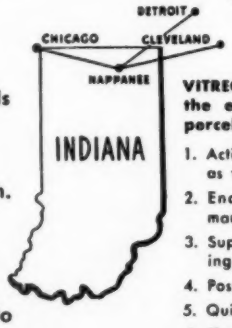
COMPANY.....

STREET.....

CITY..... ZONE..... STATE.....



The reason why porcelain enamel is being used more and more by manufacturers in many different fields is because it *is* the lifetime finish. For instance, a clothes dryer with a porcelain enameled top won't lose its attractive appearance. It won't scratch. It won't rust and stain clothes that are folded on it. Refrigerator pans last indefinitely. Outdoor tables need no refinishing. Before long your desire to give your customers the most for their money will lead you to redesign, changing paint to porcelain enamel. Vitreous Steel Products Co. has the experience and the knowledge and the manufacturing capacity to meet your demands.

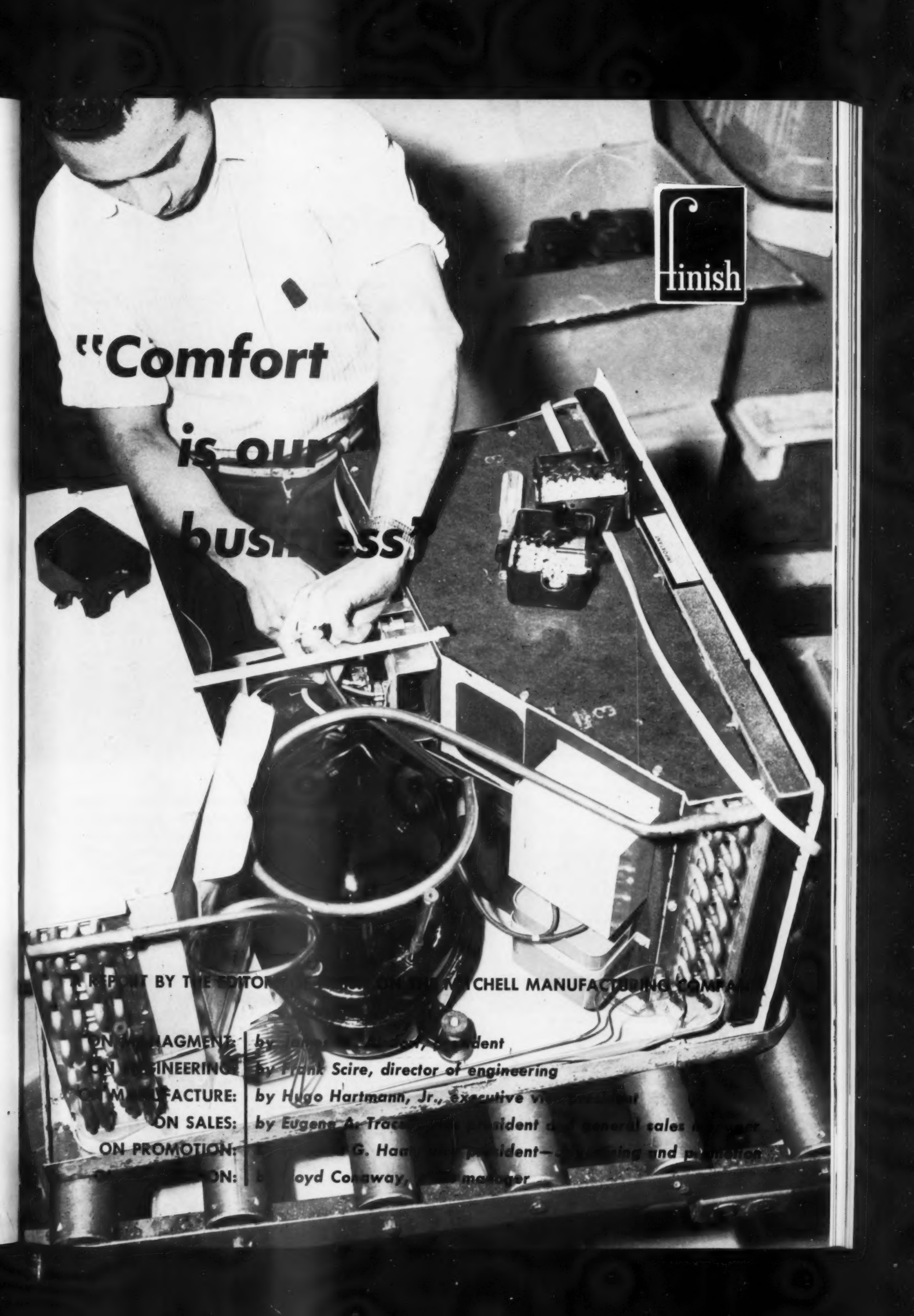


VITREO facilities help you meet the ever-growing demand for porcelain enameled parts by:

1. Acting as a source for stamping as well as enameling.
2. Enameling stampings of your manufacture.
3. Supplementing your own enameling plant.
4. Possibly saving die costs.
5. Quickly solving your color problems.
6. Keeping transportation costs low. (By operating our own trucks, we can often pick up and deliver at the same time, thereby saving most of the cost of one-way transportation.)

VITREOUS STEEL PRODUCTS CO.
BOX 3991 • CLEVELAND 20 OHIO (Factory at Nappanee, Indiana)

VITREO



REPORT BY THE EDITOR ON THE MITCHELL MANUFACTURING COMPANY

ON MANAGEMENT: by
ON ENGINEERING: by Frank Scire, director of engineering
ON MANUFACTURE: by Hugo Hartmann, Jr., executive
ON SALES: by Eugene A. Trac president and general sales manager
ON PROMOTION: G. Haa president—advertising and promotion
ON: Lloyd Conaway, manager

Cashing in on comfort

A look at the future of the independent air conditioner manufacturer by the president of the Mitchell Manufacturing Company, J. W. Alsdorf.

WHAT does the future hold for the independent air conditioner manufacturer? Can he hold a dominant position in the market 10 years from today? Or will he be relegated to playing a supporting role to the huge, full-line appliance manufacturing empires?

We at The Mitchell Manufacturing Company believe the ultimate success or failure of the independent air conditioner manufacturer rests on four basic points. We are planning our own future around these points because we intend to be a major factor in the air conditioning business next year, 10 years from now, and in all the years to come. The points are:

1 Leadership in research and engineering aimed at pioneering new developments in the field. Mitchell, 10 years ago, was one of the first manufacturers to enter a room air conditioner on the market. This, of course, was a tremendous advantage; being first always assures you of some degree of early success. Mitchell has been able to maintain this early lead because highly developed research and engineering departments have been able to achieve product improvements faster. Because air conditioning still is a very young field, research and engineering personnel must be given perfect freedom to develop new ideas, unfettered by a tradition that does not actually exist. At Mitchell our aim is to provide an atmosphere in which our research and engineering people can best create and develop new ideas.

Another danger of the appliance industry is that, after a time, all products tend to look the same . . . lose their identity . . . witness television. Mitchell has constantly strived to put a distinctive product on the market and will continue to do so. This is one strong reason for our healthy position in an industry which last year sold some 1,400,000 units.

Another important reason is that Mitchell research and engineering has pioneered in a majority of the new developments on the market. This is a "must" if the independent manufacturer is to maintain the lead.

Our engineers have on their drawing boards specific year by year innovations and improvements for the future. This is a part of a calculated plan to stay ahead of the air conditioner business.

2 Consistent high product quality. Mitchell has always been a cut above the market. It has had to be because of the perishable nature of the "name" of the independent appliance manufacturer. Mitchell never has sacrificed quality to produce a less expensive unit to take advantage of immediate (and temporary) market conditions. Others who have tried this no longer are in business. Mitchell's reputation for quality has placed it among the sales leaders. For example, in Houston, Texas, America's most air conditioned city (saturation among home owners is 14.1 per cent compared to the national average of 4.5 per cent)*, Mitchell stands number one with 11.6 percent of the total market. It is interesting to note that the next four on the "best seller" list are full line appliance manufacturers. These statistics are based on an independent survey, not our own.

Other surveys indicate Mitchell holds similar advantages in Washington, D.C., Phoenix, Milwaukee, Chicago, and other major centers where penetrating market studies have been made.

3 Development and introduction of new types of air conditioners. Mitchell's 1956 window unit, capable of cooling two or more rooms is one example of a new product in air conditioning. So is our unit, now being introduced, which will cool an entire five room house for under $600. Only those manufacturers who maintain research and engineering departments constantly improving the product and pioneering new developments can hope to succeed.

4 Develop and furnish effective marketing programs for dealers and distributors. A manufacturer's merchandising chain is as important as its product. And the distributors and dealers must be given the proper tools with which to work, to best tell the story of the product to the consumer. Realizing this, Mitchell has consistently developed a program that has produced a far greater return for the dealer's efforts. Our attitude toward distributors and dealers has been to protect them against uncertainty in what, at times, has been an uncertain market. By protecting their interests, we feel we are

*Figures obtained from Dan E. Clark II and Associates, Inc.

Party Dress for a "Jubilee Celebration" dryer

Dressed up and going places, is this sparkling, new, "Jubilee Celebration" line of Hamilton Dryers. Designed to celebrate the 75th anniversary of this pioneer firm, special attention was given to insuring a rich, lasting finish with highest resistance to moisture, chemicals and heat.

The answer? KEMCLAD®—the Sherwin-Williams white-for-life appliance finish that stays bright, clean and stain-free.

KEMCLAD Appliance Finishes are adaptable to individual drying and production line needs . . . provide the technical advantages of the most extensive laboratories in the world devoted to paint research. Investigate what these or other Sherwin-Williams developments can do for you. Contact The Sherwin-Williams Co., General Industrial Division, Cleveland 1, Ohio or Montreal, Canada.

Gold and black trim accentuates gleaming white KEMCLAD finish on new Hamilton Dryers.

SHERWIN-WILLIAMS

INDUSTRIAL FINISHES

ALSDORF CONTINUED

following the best possible method of getting our products on the market.

Adherence to these four points has been Mitchell's policy over the past 10 years. It is our policy today, and it will be our policy in the future. We firmly believe the independent manufacturer can thrive in any market, no matter how competitive, if he builds the best unit possible, prices it realistically, and treats his distributors and dealers with fairness and respect, and gives them a competitive edge through a superior product.

This program also will decide Mitchell's future in the central air conditioning field which we entered last year with models for commercial and residential use. Along with most other people in the industry we feel this is the most important trend in air conditioning and are going to be a major part of it.

As the industry grows . . . and its potential is tremendous . . . we will continue, not to just go along with it, but to lead the way.

MANUFACTURING THE MITCHELL Hugo Hartmann, Jr., executive vice presi

THERE is nothing exclusive or enduring about the price — particularly when the low price results reduced quality. Our manufacturing thinking has be produce the highest quality product at a price that pro our Sales Department with a competitive offer in the ma

Has this paid off? It has — as evidenced by the published in a recent consumer survey of the Pho Arizona, market, where Mitchell, again, is number o consumer acceptance because the consumers are sati not only that Mitchell is a strong name in the air condi ing business, but that it is a product that will give many years of comfort conditioning.

Through the years, Mitchell has refined its manufact processes, engineering and procurement to the point the production line operates with the precision of an acc watch. This cuts down on overhead, increases empl productivity and improves product quality.

Quality control in a large measure determines the ulti level of manufacturing proficiency. Our operation is l to not only a strict and tight production schedule, but quality level that will come as close as possible to elimin field service. We interpret the wishes of the Engine Department and the realistic availabilities of the Pur ing Department into an efficient manufacturing opera

SELLING THE MITCHELL Eugene A. Tracy, general sales manager

THESE are days of intense competition in the appliance industry, as well as most other industries. In the creation of a sales plan, to successfully compete with sophisticated merchandising manufacturers, it is necessary that the offer of any branded appliance furnish a specific reason why a particular brand should be purchased by the public, the dealer and the distributor.

This reason can take many forms: It can be based on the superior performance of the product, although this is often difficult to sell in the face of superlative claims by competitors. It can be based on low prices — but, of course, there is no patent on price cutting. It can be based on superior features that make it easy for the dealer to present an argument to the public as to why they should buy the product, and this often is the most successful type of product appeal.

It can also be based on a merchandising program or unusually large advertising expenditures which are designed to influence the public favorably toward that product. At Mitchell, we have tried each year to furnish at least two and sometimes three specific "reasons" why the Mitchell product should be purchased by the dealer, and why it is likely to be more easily sold to the public.

We have found, that, by a combination of competitive pricing and features obvious to the dealer and easily sold to the public, we have been able to develop the largest volume of sales in room air conditioners.

During the last few years we have devoted a portion of our time and of our sales effort to the promotion of our Imperial line, which is much higher in price than anything on the market, and equally obvious in its operating superiority.

So strongly has this plan been developed as to have created sales during 1956 on the Imperial line at those high prices to an extent of more than 15% of our total sales from factory to distributor, and from distributor to dealer.

Many of our distributors have told me that even in areas and periods when the worst kind of price cutting was rampant, they were able to sell the high price Imperial model because it was outside of competitive offers — there was nothing like it available in the industry.

Thus, although our sales are much larger in lower price models, we have developed a sufficiently large volume of the Rolls Royce type to give our distributors and dealers better profit margins and also to create for the Mitchell brand a reputation of quality. . .

ENGINEERING THE MITCHELL Frank Scire, director of engineering

AT Mitchell, we have what I would term a conventional breakdown in the Engineering operation, dividing the division into three groups: Research, Development Engineering and Production Engineering.

The Research Engineers, in order to accomplish creative thinking and follow this to a practical production possibility, are kept separated from every-day production problems. The Research Engineering Dept. has been able to furnish new ideas which have been used in our room air conditioners each year since the introduction of the Mitchell room air conditioner some ten years ago.

The Development Engineers create prototype samples of newly designed room air conditioners. When prototype testing is completed and the unit contains all of the sales and engineering features required, the prototype sample is supplied to the drafting department. Metal fabrication is then analyzed to obtain the lowest possible overall unit design cost. The Development Engineering Dept. is responsible for the complete testing of the new models proposed for production.

After a unit has been developed and designed, production standards must be established in order to maintain prototype performance and quality in production. Production Engineering is responsible for production noise level standards, production fan motor performance, production compressor performance and, most important, test room standards which may determine an undercharged or overcharged unit. Production Engineering works hand in hand with Quality Control Dept. to maintain the highest possible quality.

This organization of the basic engineering departments provides for an homogeneous engineering structure from the initial conception of the unit in the research stage to the final production performance standards.

PROMOTION OF THE MITCHELL
Howard G. Haas, advertising and promotion

"PEOPLE buy because they are sold" — this is a basic foundation for selling in the appliance business.

Since a lasting business can never be based on the price appeal alone, we have devoted our energies, efforts and our advertising expenditures to the sale of our product, advantages and the built-in superiority and design.

When the air conditioning business was in its infancy, room units were sold through electrical jobbers who have never been known to be in a position to do an outstanding job in specialty selling.

Mitchell pioneered the introduction of the room air conditioner to the appliance dealer and used the best techniques of merchandising and sellng that have been refined in the appliance business to build its dominant position in the industry today.

By taking such original and exclusive product features as the Weath'r-Dial control, Cool and Heat, True-Flush Mount and Air Flow Modulation, and using these built-in product advantages as selling handles, Mitchell dealers could point out in an obvious fashion the excellence of the Mitchell product.

It is always easier to sell a product that has a feature. It is easier to sell a product that has a feature that is so obvious the customer "trips on it" as the salesman presents the product.

It was our engineering and manufacturing people who came up with the selling features that we have used as tools, wedges for building an advertising program around Mitchell.

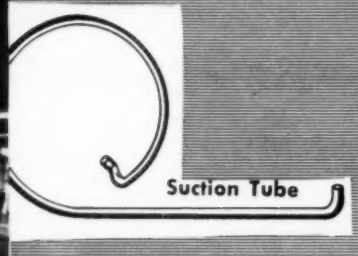
This is the kind of coordination between manufacturing and selling that makes the independent appliance manufacturer a leader in the industry — an industry as important as room air conditioners — and is one of the basic reasons for Mitchells obtaining its role as leader in the field of room air conditioning.

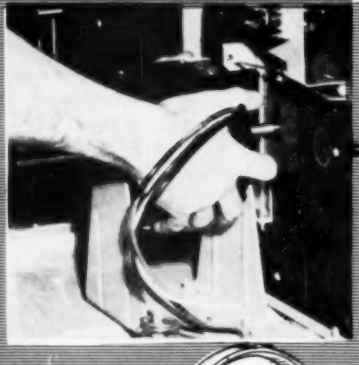
Although room air conditioners traditionally are a seasonable product, the selling job is a 12 month task which includes product introduction to the trade, trade advertising, sales training, point-of-purchase display, newspaper, radio and television advertising (saturation campaigns) — local advertising, national advertising and new dealer developments, all keyed and coordinated to the product features and mechanical advantages built into our units.

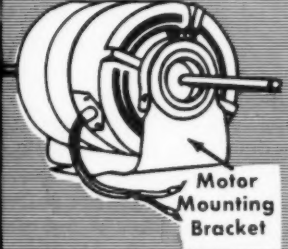
ENGINEERING COMFORT

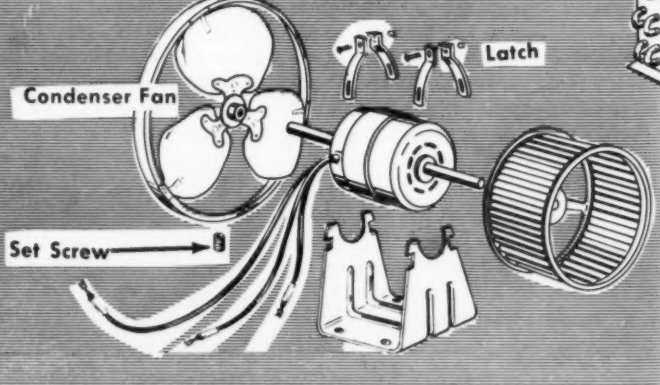
Salient features in the Mitchell room conditioner line pointed out in this photo mural. Manufacturing details are on the pages that follow

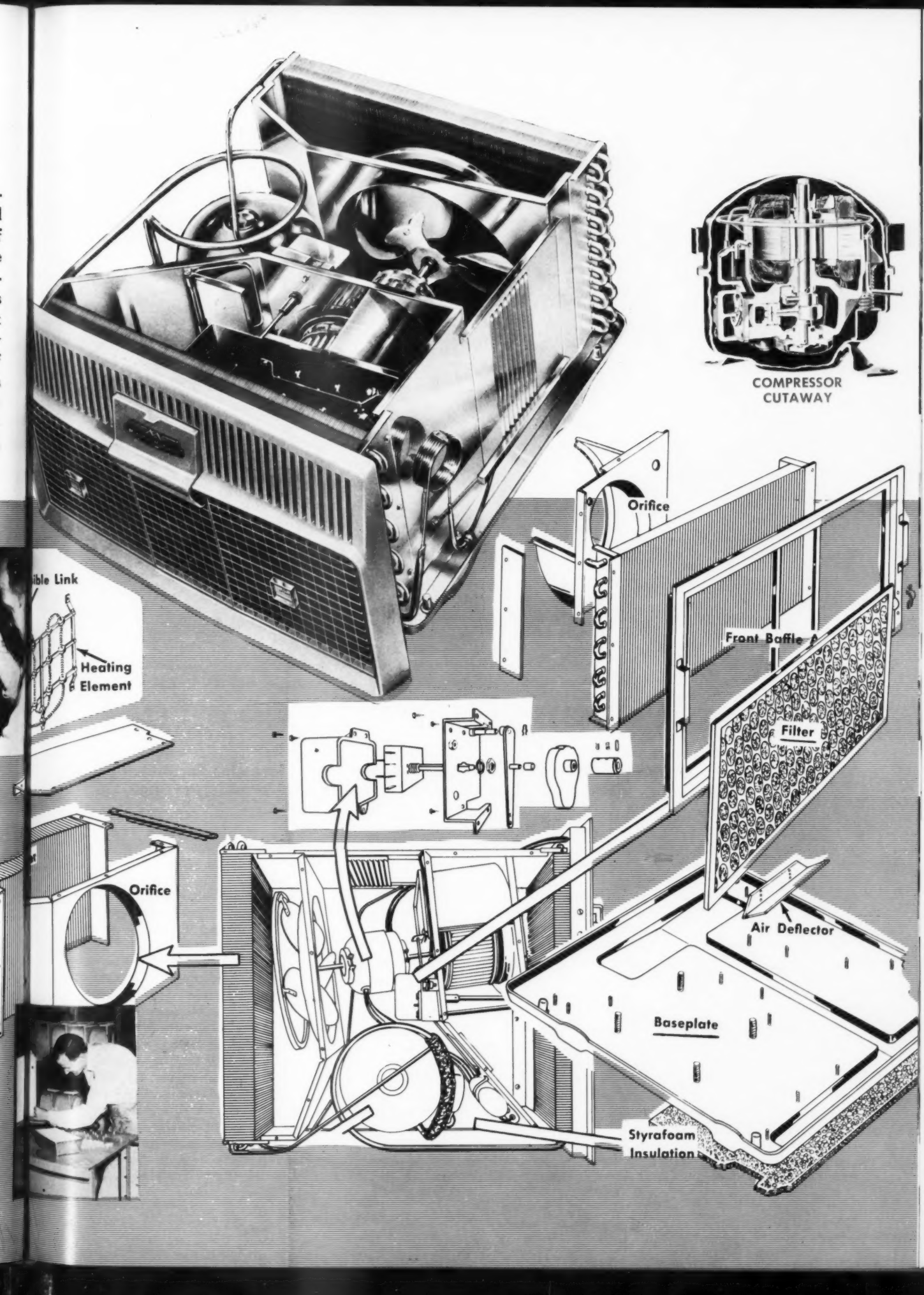
Many of the salient features of the Mitchell Imperial series are illustrated in the photo mural below. Others, however, need some word of explanation to give them full broadcast. The Mitchell Model M-346 shown here and discussed on the following pages, operates on 115 volts. Designed to fit into windows as narrow as 30″ wide such as found in many older residential areas, it is flush mounted, a standard of the industry pioneered by Mitchell. Single Knob Control—a feature which Mitchell calls their Weath'r-Dial—is a combination electrical switch mechanism that opens and closes the ventilate and exhaust doors, besides operating the two-fan motor and compressor. This provides seven levels of comfort. Resistance heating—called the Dyna-Heat—provides some 4,160 Btu's hourly operating on 1150 watts. The unit's thermostat, located at the front of the unit adjacent to the control knob, responds only to room temperatures and has a range of 68° to 95° F. A manual position provides constant cooling when desired. Mitchell has built into its Imperial series such additional features as 1/2 inch copper tubes in the evaporator coil.










COMPRESSOR
CUTAWAY
Orifice
Front Baffle
Filter
Air Deflector
Baseplate
Styrafoam
Insulation
Heating
Element
Orifice

finishfotos

Mitchell manufactures comfort

a report on the procedures used at the company's manufacturing facilities for fabrication, metal treatment, painting, assembly and product testing.

AN EXCLUSIVE FEATURE *by Lloyd Conaway,* PLANT MANAGER

Exclusive feature finish

PROCEDURES in the manufacture of the three-quarter ton Mitchell room air conditioner are similar to those used for each model in the Mitchell line, whether it be the room conditioner series or the home and commercial lines. All are processed through the same fabrication, assembly line procedures, utilizing subassembly operations to the utmost to provide the most simplified final assembly flow.

At Mitchell, the actual programming of our manufacturing operations starts long before a model goes into production. We have what we call our "Plan for Manufacture" — a process which, to me, seems the most important of all the operations which we carry out to create a cooling plant.

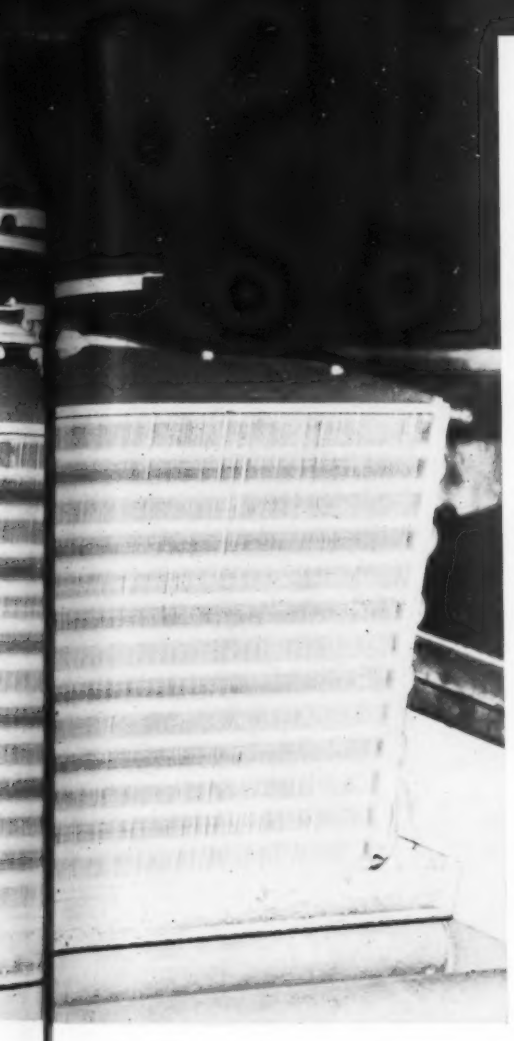
While the manufacturing division has been working in cooperation with design and engineering in the creation stages of a model, it is at the "Plan for Manufacture" stage that things start falling into position.

The "Plan for Manufacture"

It is now that the "new design" is literally torn apart. Each piece to be fabricated is given full study, and individual spec sheets are prepared. Working for a time as a single group, the Manufacturing, Purchasing and Engineering Committees begin matching up parts to existing facilities and finalize the estimates as to the cost of manufacture.

With this study completed, a prototype unit is mocked up and sent through an exhaustive series of laboratory tests to provide a full understanding of performance. Optimum and minimum ranges in power and performance are set and the statistical results compared with the original engineering specifications. "Idea of operation" developments, discovered as the trial unit is put through tests, are often a by-product of this study which results in a better unit than the original design.

Once all parties concerned are satis-



fied with the unit's (1) performance, (2) appearance, (3) cost of manufacture, (4) adaptability to existing equipment or operating procedures, the second stage of the "Plan for Manufacture" comes into being.

Establishing cost standards

Tooling designs are drawn up, approved and ordered. Manufacturing and processing procedures are set down to paper, and time standards determined for use in fixing the final cost of manufacture.

With tooling completed, the set-ups are made, and each section master-craftsman makes a sample run with the tools. Information observed during this operation is duly recorded and marked for the final study. Moreover, all parts are given a thorough "silk screen" inspection and are approved by the product and process engineers before the pre-production units are assembled.

The regular manufacturing operations of the plant are rearranged for allowance of a trial run which is set up and put underway. As this is being done, the statistics gathered during the initial phases, along with the visual observations, are brought together, correlated and studied. Final engineered predetermined times values are set down, and the work is measured for a day rate base. This completed, the final exact cost of manufacture is determined and, after approval from the three part committee, routed to management for final approval.

Training for new production

With this received, full production begins. Lead men and key operators, previously briefed in the manufacturing procedures set down by the coordinating group, are made responsible for training of the line personnel, each in charge of training or re-orientation of his individual crew. By this method of decentralized training, the entire plant is quickly brought up-to-date and full production rapidly achieved with little lost time in man-hours.

At this point, we now have complete facilities for manufacture, a bugged-out unit and a trained crew. The procedures of manufacture are now fully put into force.

Mitchell's manufacturing facilities

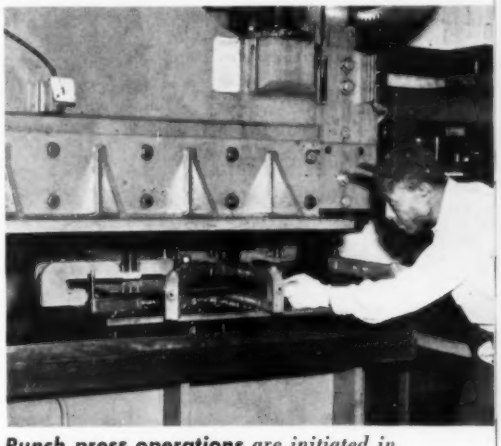
The complete facilities for the manufacture of Mitchell's line of refrigeration plants and products are situated in a five story building on Chicago's north side. This plant, which contains both the complete fabrication and assembly divisions, also houses the sales force and management team. The only additional facilities are warehousing and repair parts depots, situated at key spots across the United States, as well as regional and district field sales offices.

A multi-storied operation

In spite of the widespread pattern to move such operations to single story buildings, Mitchell has taken full advantage of the multi-storied operation and is fully satisfied with the present layout structure. In the 200,000 square feet of work area, plans now call for upgrading the facilities for plant load some 75%. This is best defined by making comparison with present production which requires some 450 tons of steel monthly for processing.

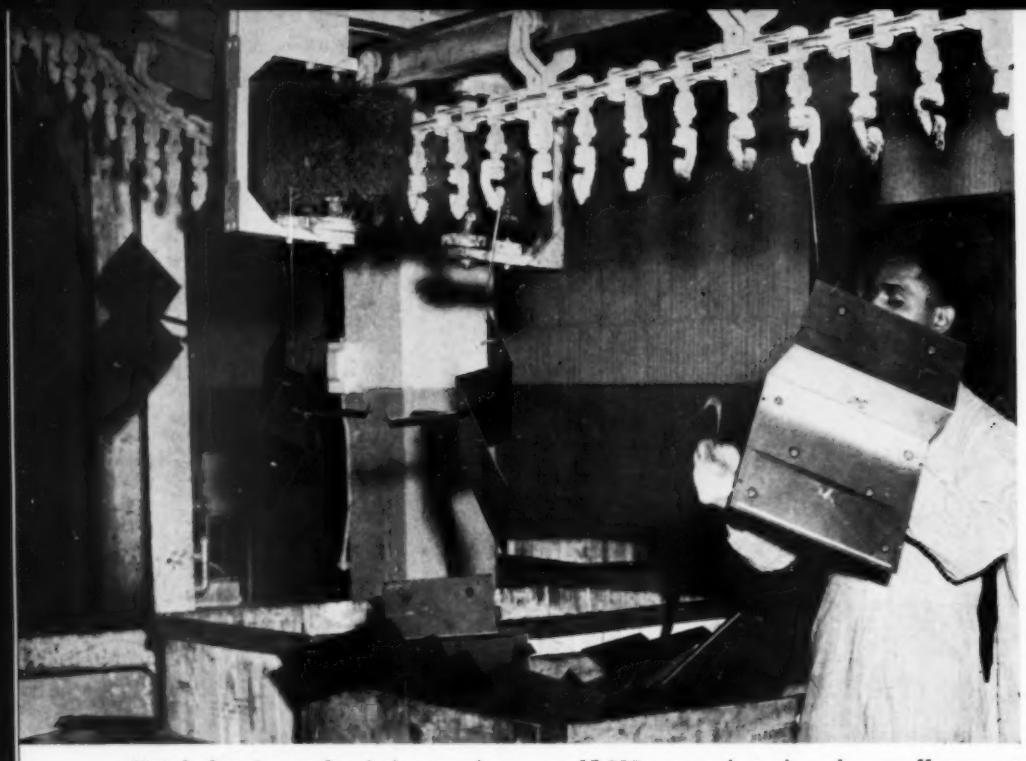
At present, floor space is allocated in the following fashion: first floor, shear room and fabrication; second floor, assembly line for the packaged conditioner lines; third floor, assembly lines for dehumidifiers, management and sales offices, engineering and laboratories and company cafeteria; fourth floor, welding operations, metal cleaning, painting section and sub-assembly lines for room air conditioners; fifth floor, room air conditioner line assembly and packaging division. Servicing these five floors are four material elevators, as well as

***Some 450 tons** of sheet metal are processed monthly through the shear section where blanks are cut to order.*



***Punch press operations** are initiated in the shear room for fabrication of such large pieces as shown being processed.*

***Fabrication** is done for the most part in multiple die operations. The plant has 27 presses ranging up to 165 tons.*



***Metal cleaning** and painting requires some 15,000 square feet of work area. Here, parts are being hung on the overhead conveyor system just prior to their entry into the cleaning tank. The conveyor system, carries the parts through cleaning and on to the paint area.*

***Painting operation** is accomplished in this water wash spray booth. The prime coat and top coat are applied.*

MITCHELL CONTINUED

the regular elevator for personnel. Another constant-travel elevator system is used to move the finished packaged product directly down from the packaging section to the shipment docks.

Plant fabricating procedures

Some 450 tons of sheet steel are delivered monthly to the plant by truck. A power-driven crane removes the steel from the trucks to the shearing area where 250 tons of steel are stored for processing. Predetermined sheet sizes of 11 to 20 gauge are processed through the shears where the blank sizes or multiple of same are cut depending upon the fabrication demands. Sheared parts are stacked on pallets and transported via fork trucks to the Fabrication Section.

Progressive dies are used for making small parts and in some instances on presses with roll feed. Larger parts requiring several operations are processed for multiple die operations. Our blanking, piercing, drawing and forming procedures are, I should say, much similar to those throughout the metal fabricating industry. We do use, with as many parts are possible, sequence stamping procedures which have proven a top economy method in our operations.

We have seven presses ranging from 90 to 165 tons capable of doing multiple die operations. Some of these presses have a bed length of 12 feet. Twenty conventional presses also allow much in series operation. Our tool room is equipped to handle all tool and die maintenance and also makes assembly and welding fixtures and a relatively small part of our die requirements. Some 2000 parts including the 30 used in a single model of the ¾ ton Mitchell are fabricated from raw materials.

Dispatch cards are used as the media for placing each component into work. The dispatch card, which describes each operation performed, travels with each lot of material to completion. This card is also used in the quality control procedure and ultimately reflects the efficiency of the individuals who perform the various operations and the frequency of quality check.

Standard welding procedures

All stampings welded in the Mitchell operation are plant fabricated with the exception of the room cooler base plate, and some of the larger cabinets. The base which is 14 gauge requires larger equipment for stamping than is feasible in present operations.

In our welding section we use twelve full time resistance welders plus Heliarc and spot gun welding equipment. This is sufficient for our present load, but with the planned expansion, specifications call for this to be augmented with projection type welders in size up to 150 KVA to be installed shortly.

In the design of component parts to be welded, consideration is given to means of positioning parts without the use of welding fixtures where possible. One method is that of semi-perforations in one part to engage locating holes in the companion part. Light weight aluminum fixtures with toggle clamps generally describe the type of welding fixtures that are used.

Heliarc spot gun welding with electronic cycle control has increased the economics of welding frames too large to handle thru the conventional spot or projection welder. Also in the larger cooling equipment, arc weld is used at

***Subassembly operations** are planned to minimize to the fullest any line assembly. Here a baffle assembly grows.*

Small parts painting *is carried on in the same area as the large part painting operation but in a separate line. Parts are washed and degreased in baskets, then arranged on wire shelf pallets and routed on a revolving conveyor through a separate paint booth, then shuttle-type oven fired.*

ware, *after traveling some in the open air for cooling, cked from off the conveyor.*

high stress points of heavy gauge materials.

Fabricated parts are stacked in skid boxes and, via fork trucks, carted to the nearest elevator for movement to the paint section on the 4th floor. The larger parts are given conveyor handling, while small parts are prepared for basket cleaning.

Preparation of metal

The metal cleaning, painting section covers some 15,000 square feet of work area. A continuous conveyor line running completely around the area approximately 9′ inside of the room perifery, is used for continuous cleaning, painting, and in the baking operations.

Parts are attached to the hooks of the conveyor, which travels at a 10 fpm constant speed, and introduced into the cleaning tank. This operation is set up as follows: caustic cleaning at 160°F; phosphatizing solution at 160°F for 2 minutes; hot water rinse for 60 seconds; and the final chromic phosphoric acid rinse at 100°F for thirty seconds. Each of the stages is followed by a 50 second drain period. Processed parts then travel through the drier section where they pass through a temperature of 420°F for approximately 3 minutes.

In the period between the drier and water wash booth (approximately 8 minutes) the parts are cooled and are now ready for the paint operations. A five man crew is used in this spray operation, spraying a primer coat followed by the top coat. The paint, a synthetic enamel, used in the coating has been tested for viscosity at 23 seconds with Ford Cup. After the finish coat there is an air dry period of six minutes.

The painted parts are then processed through a double pass 45′ long oven. They are given a 10 minute bake at 350°F and then travel an additional 50 feet, sufficient time for cooling, before being picked off. They are packed, with wax paper between each level, in pallet boxes for transport to the assembly sec-

sive backed insulation, *purchased in its correct , materially speeds preparation of the sub- bled parts, as shown here by this sub-assembler.*

Subassembly operations *include, as much as possible, pre-assembly of wiring mechanisms to speed final assembly.*

Combination sound deadening *and moisture prevention panels of insulation cover the plenum nearest room.*

PRE-PAINTED METALS

your product can be made from pre-painted metals!

Manufacturing from Pre-painted and Pre-coated Metals . . . *is* being done very successfully by many manufacturers who formerly thought it *couldn't* be done! And—it's being done very *profitably!*

Maybe You Think It Can't Be Applied to Your Products . . . but wouldn't it be worth a real try? There's no cost or obligation for a sample.

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tion of the plant. The oven heat is supplied by gas fired infrared convection burners, and controlled conventially.

Smaller parts are processed in the work circle inside this conveyor set-up and are sent through a separate procedure. The parts are washed and degreased in baskets and then arranged on wire shelf pallets in close proximity. They are then placed on a revolving conveyor which rides through the two water wash spray booths, where they are manually sprayed. They then travel to the rear area where the entire tray is lifted and placed in a rack This rack is moved into an oven where the ware is given access to a 350°F temperature for a 10 minute period. The parts are then boxed and shipped to the assembly section.

In scheduling parts for the cleaning-painting section. we follow two procedures at all times to introduce added economies to the operation. Small parts, which more readily lend themselves to storage, are produced during the off-shifts for the most part. The larger components are then processed during the regular shift in close correlation to production line requirements, for the obvious reasons.

Assembly of the Mitchell

The main assembly line set-up is on the fifth floor. The conveyor line — 500 feet long — section, with the multitude of off-shooting subassemblies, continues directly into the pre-testing and pre-run stations of the plant, which feed directly into the packaging line.

The first step in the assembly is insulating of the base plate. The plate, situated upside-down at a 45° angle, is brushed with adhesive and a ⅝" thick high-K factor material applied. The plate is then righted and set upon a metal pallet, where it will ride completely through assembly, testing and to the packaging line.

Subassembly operations

In the subassembly line the plenum has been assembled. This includes attachment of the unit's control mechanism, the heating element to the front of the orifice, installation of the blower wheel, etc. Felt backing has also been attached by means of adhesive to the back, sides and top to eliminate the possibility of "sweat" and to deaden any sound of the unit in operation. The subassembled part includes the exhaust door and ventilator door. With the evaporator coil, it becomes the first installation on the 14 gauge steel base. Placement is made to fit into the bolts up-thrusting through the plate. This is bolted down.

Partially assembled, *the photo above shows the ¾ ton Mitchell unit, riding on its metal pallet, with the condenser and front plenum assembly, as well as the compressor, installed. Note the spring mountings, which themselves ride on rubber grommets, used to eliminate the vibration of the compressor when in operation.*

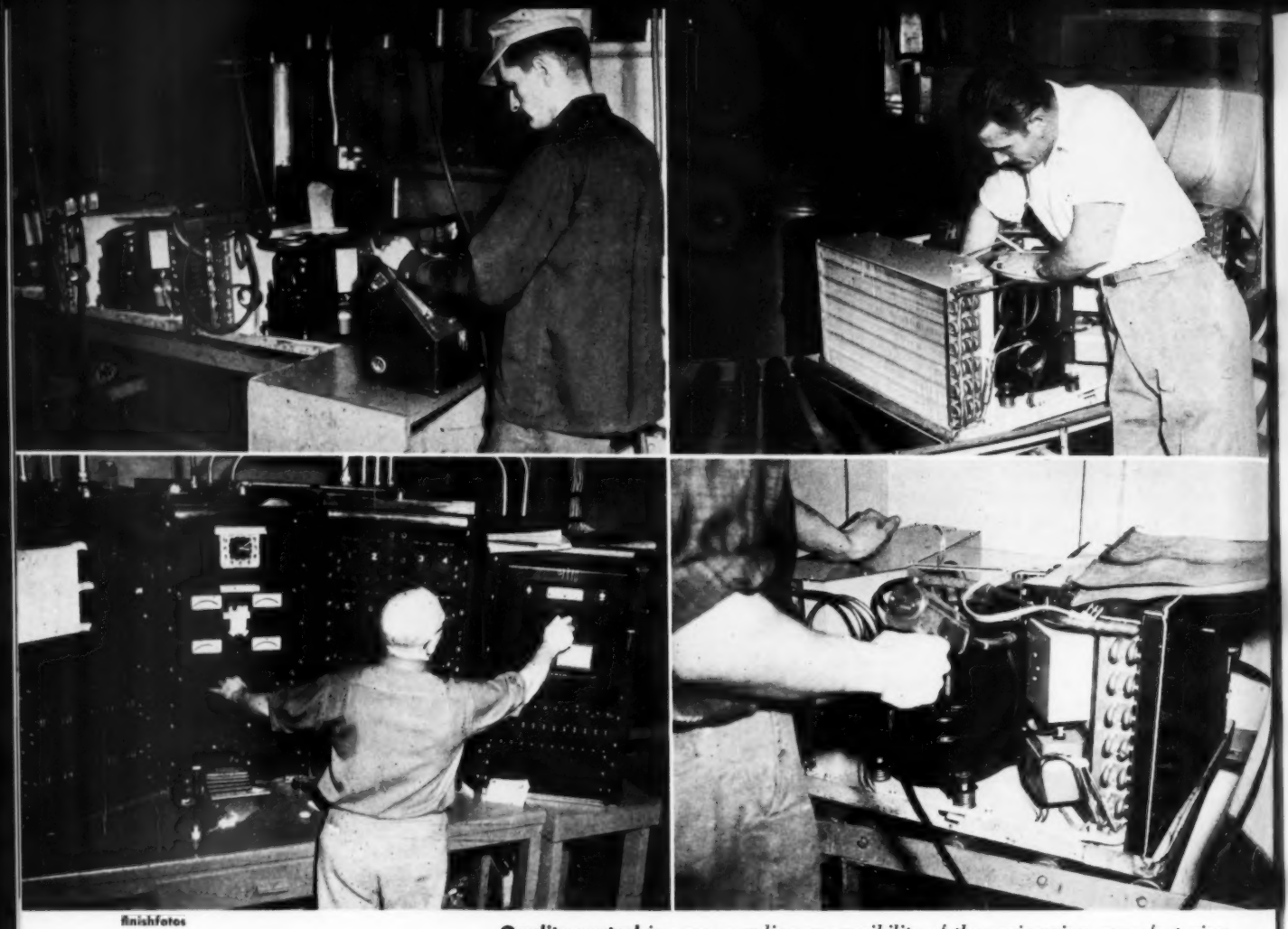
As it is installed, one workman places the grommet based springs which will hold the compressor in position and elminate vibration.

In the second operation the fractional motor is installed. This unit has been through the subassembly also, with the mounting base and wiring completed before it reaches the line.

Preparation of the compressor

As the parts move up to receive the compressor, the subassembly on this unit is also being carried out. The shipper's palletized box is moved onto a levelator which brings it up to work position and to the level of the subassembly conveyor line. Here, the hermetic seal is removed from the tube connections. The unit is then equipped with its electrical parts which are assembled and encased in the subassembly operation. This component box contains the starting relay and the starting capacitator, as well as an overload protector. These fitted into place, the unit is fed to the assembly line and is placed in position, onto the grommet based spring mounting, and bolted down.

The condenser and orifice are then installed and the four-bladed condenser fan set into place, fitting into the shaft



finishfotos

***Quality control** is a never ending responsibility of the engineering, manufacturing, quality control and testing divisions of the company. Here are shown four operations in the series of tests given to each Mitchell, during assembly, and before shipment, to assure the optimum quality of the finished product.*

MITCHELL CONTINUED

of the fractional motor installed previously.

Tubing shaped up in subassembly

In another subassembly operation the suction tube of ½" copper tubing is being formed, as are the capillary tube, equipped with strainer, and the liquid line. Assembled and tested, these parts are added to the unit as it proceeds, immediately following installation of the condenser.

In another of the many subassembly operations, the front baffle assembly is being processed and adhesive backed felting and water proof strips positioned for fitting into the unit. These are fed to the assembly line for installation. As these progressive steps are made in the creation of each unit, the electrical cords and connectors have been put into place and final connections made. Tests for quality control are also in process both in the assembly and subassembly section. The discussion on these will appear later.

The completed unit, still without its refrigerant or the system hooked up, is then fitted with its splash baffle.

There are six quality control stations in the main assembly and subassembly areas for test-outs of the components and the unit being assembled. An inspection "traveler" is attached to each unit at the start of the assembly, and this individual history, correlated to the serial number of the unit, provides a complete picture of the unit as well as a "proof check" for each installed component.

Process for dehydration

After all refrigeration tubing has been assembled and welded into place, one refrigeration tube circuit connection is left open. These open ends are used in the dehydrating station, where the entire refrigeration system is dried to a dew point reading of minus 40°F. At this point, the dehydrating system lines are disconnected, and the unit is given a 100% testing for dew point. Passing these procedures, the welding of the entire refrigeration system is accomplished, making a permanent seal. 300 psi of dehydrated air is then forced into the system and held for a check period for leak detection prior to the final charging.

Assembly inspection stations

The conditioners are then attached to automatic charging boards, in a temperature controlled room where an automatic sequence device controls the operations of charging the system with freon. First, there is a vacuum cycle, and after a carefully calebrated time period, the freon is automatically introduced into the system in a pre-determined amount. For instance, in the ¾ ton unit, 25⅜" ounces of freon are introduced, and this amount is under critical control. The process tube is then crimped, process valves removed and the process tubes sealed by welding.

In the final test inspection area, the units are hooked up to feed rail junction boxes which travel on a powered conveyor for an approximate 20 minute

to Page 69 →

The Chicago Mill engineered and laboratory-tested container, designed specifically for air conditioners, is shown in use at the Mitchell Manufacturing Company plant.

here's the most practical container for shipping air conditioners!

In order to meet the requirements of the growing air conditioning industry, Chicago Mill had its engineers design the best possible container for the protection and shipment of air conditioners. The hinged corner plywood container that was developed offers these advantages:

- Maximum protection
- Low cost
- Fast assembly
- You can stack them 20 high for compact storage wtih a good factor of safety

Contact your Chicago Mill representative for complete information.

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Cleated Plywood
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Shop and Tote Boxes
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Quality

VAN SEAL

TRADE MARK

SINK FRAMES

All the advantages of the modern, efficient clamp-down frame are yours with VanSeal —PLUS—scientific production-control methods that give you unsurpassed quality. VanSeal frames are made of stainless steel, precision formed by expert craftsmen and finished with a "satin glow" sheen. You can depend on these VanSeal outstanding features:

● **PERFECT BENDS . . . EVERY TIME**

Each corner radius is exact, assuring a perfect fit . . . and each is perfectly bent—no ripples mar the smooth top surface.

● **LEGS ARE ALWAYS VERTICALLY STRAIGHT**

The vertical leg of each VanSeal frame is always at a true 90° angle to the top surface for easier installations and a tighter seal.

For all flat rim sinks with round or square corners

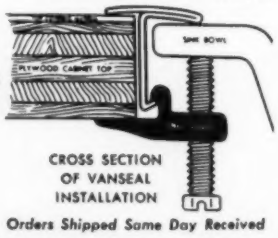
● **ALWAYS UNIFORM**

Every frame conforms exactly to dimensions specified. Quantity users can depend on exact uniformity of frames of same size.

● **INVISIBLE WELDS**

VanSeal stainless steel frames are welded so perfectly and finished so smoothly that joints cannot be detected on the top surface.

PATENT NOS. 2,440,741 and 2,704,370



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Winneconne, Wisconsin

A still newer concept of universal design in Open Coil Heating Elements mass-produced with automated control.

THIS GOLDEN ERA FINDS US DEDICATED TO THE HOPE OF CASTING A RADIANCE OF GOOD WILL UPON THOSE WHOSE FRIENDLY ENCOURAGEMENT ENABLES US TO DELIVER EVER INCREASINGLY BETTER VALUES.

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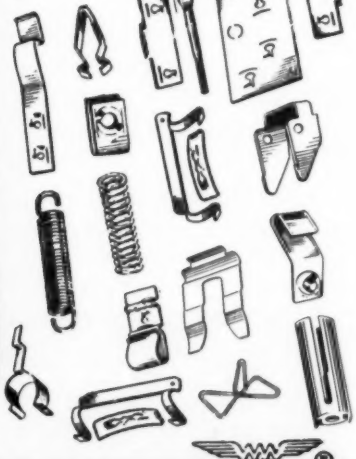
SPECIALS tailored TO YOUR DESIGN



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SUBSIDIARY OF THE BARIUM STEEL CORP

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MITCHELL CONTINUED

period. In this test cycle, the complete electrical system is given a thorough check with stroboscope units used to check the motor speed, and a dielectric ground test is made. The heated-up unit is given a freon leak test with hand operated detectors making a thorough check at each junction point.

Passing this test, the unit is then sent through final performance testing procedures in a controlled atmosphere. The unit, still on the assembly pallet, is slipped into one of the 24 positions and connected up.

Product test procedures

Thermocouples are inserted into the strategical points of each unit — predetermined positions — and then, by means of a remote testing station, each unit is individually ushered through a complete set of tests. Power wattage, electrical readings, temperature records are noted on the inspection "traveler". In this final inspection the unit is turned up into full operation with individual checks on separate characteristics.

A wattmeter is switched on, and the wattage must be within specified limits, designated by curves furnished by the Engineering Dept. Should a unit fail this test, it is removed on a side track to an area for complete analysis and correction and again subjected to the complete prerun and test procedure.

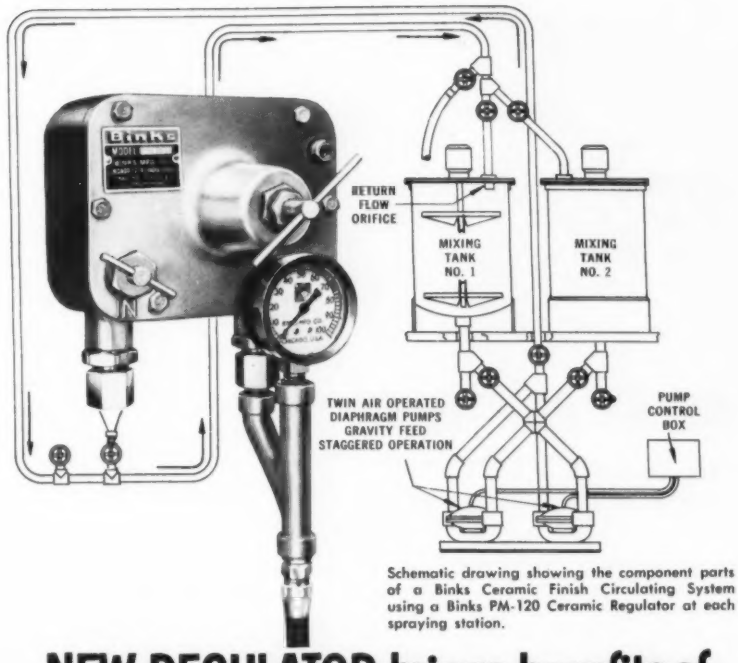
Air capacity readings, temperature differential readings, room ambient temperatures are compared to limit curves drawn up from tests performed on pilot models in accordance with ASRE standards.

Details noted during these tests are inserted on the inspection "traveler", and the approved unit is then unhooked from the inspection paraphernalia and moved into the final pre-packaging check point.

Final quality check

Here, in a controlled atmosphere the unit is given one final check with a detector set at an extremely high degree of sensitivity used to check for any possible leakage. Having passed this test, the unit is equipped with a wiring diagram, its U.L. label, and is moved into the packaging area.

The story of Mitchell's packaging operation will be told in word and pictures in the Safe Transit Section of the August issue. Mitchell, a certified company under the National Safe Transit program, has an excellent packaging procedure worthy of close scrutiny.


RETURN FLOW ORIFICE
MIXING TANK NO. 1
MIXING TANK NO. 2
TWIN AIR OPERATED DIAPHRAGM PUMPS GRAVITY FEED STAGGERED OPERATION
PUMP CONTROL BOX

Schematic drawing showing the component parts of a Binks Ceramic Finish Circulating System using a Binks PM-120 Ceramic Regulator at each spraying station.

NEW REGULATOR brings benefits of Circulating System to Ceramic Finishing

Binks new PM-120 Ceramic Regulator provides the missing link, which up until now has denied the advantages of circulating systems to ceramic finishing.

It accurately controls the flow and fluid pressure of porcelain enamels and ceramic glazes —maintains these controls at each spray station on the line.

Currently used by Hotpoint, look at the advantages a ceramic finish circulating system provides—

- Laboratory exactness of mixing—plus fluid contamination control.
- Identical materials and colors at all spray stations.
- Central mixing and materials storage reduces handling—makes possible a safer, cleaner plant.

For further information

If your plant has multiple spray stations applying ceramic finishes, it will pay you to talk to a Binks engineer about the economies of Ceramic Circulating Systems and Binks complete line of precision spray finishing components. Write to the address below—there's no obligation.

Ask about our spray painting school
Open to all... NO TUITION... covers all phases

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EVERYTHING FOR CERAMIC FINISHING

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REPRESENTATIVES IN PRINCIPAL U.S. AND CANADIAN CITIES • SEE YOUR CLASSIFIED DIRECTORY

AMA "SUMMER SCHOOL" OPENS JULY 9 AT COLGATE UNIVERSITY

During July and August the American Management Association will hold over 60 seminars, courses and small-group conferences as part of its second annual series of summer meetings at Colgate University, Hamilton, N. Y. Over 1,600 business executives are expected to attend.

SPEED QUEEN MOVES DRYER PRODUCTION TO WISCONSIN

Speed Queen Corp.'s automatic dryer production will be moved from Algonquin, Ill., to the Ripon, Wis., plant as part of a $1 million expansion program. All the company's production of home laundry equipment will then be at the Ripon plant.

FEDERAL ENAMELING ENTERS STAINLESS SINK FIELD

The Federal Enameling and Stamping Co., McKees Rocks, Penn., has expanded into the stainless steel kitchen sink field, announced Ben Roe, vice president of the sink division. The company also produces porcelain enameled steel sinks. The new stainless sinks come in single and double models and are undercoated with sound-deadening material like an automobile.

RCA WHIRLPOOL APPLIANCES GETTING WARM RECEPTION

The new brand name of RCA Whirlpool is being well received by retailers, according to Elisha Gray II, president of Whirlpool-Seeger Corp., St. Joseph, Mich. He says that reports from the field have been constructive and enthusiastic about the full-line (appliance) approach the company has made. Whirlpool-Seeger is also delivering freezers under the new brand name to a 'substantial' group of dealers who previously sold the Harvester brand. (Whirlpool-Seeger bought the Evansville Ind., factory of International Harvester early this year.)

Expansion is progressing rapidly at the dryer manufacturing facilities in Marion, Ohio, and at the Clyde, Ohio, plant where automatic washers are produced.

WESTINGHOUSE APPLIANCE PRODUCTION UP 35%

Westinghouse appliance production at Mansfield and Columbus, Ohio, plants is up 35% over pre-strike levels. According to John W. Craig, Westinghouse vice president and general manager of the electric appliance divisions, employment at the two plants is nearly 1,500 above what it was before the strikes. Craig has also announced that dishwasher production will be moved to the Columbus plant on July 1 in order to make room for increased production of automatic washers and dryers at Mansfield.

EVANSVILLE SALUTES SERVEL DURING WEEK-LONG PROGRAM

"Servel Week", sponsored by the Downtown Retail Merchants Assn. of Evansville, Ind., celebrated the 30th anniversary of the introduction of the first Servel gas refrigerator and the initial showing in Evansville of the company's newest refrigerators, room air conditioners and Wonderbar refrigerettes. Displays of the latest Servel models were set up in downtown stores, banks, etc., and Servel executives were interviewed on radio and television stations. Climax of the celebration was the drawing of three names for free gifts of Servel appliances.

KELVINATOR BOARD NAMES CHAPMAN, JEFFREY, TRAVIS

TRAVIS

CHAPMAN

JEFFREY

The election of B. A. Chapman as vice president in charge of operations, American Motors Corp., Detroit, has been announced by George Romney, president and board chairman. Chapman, formerly vice president and general manager of the Kelvinator Div., will continue as chairman of the appliance division's operating committee. Walter Jeffrey has been elected to succeed Chapman, and Homer L. Travis has been named vice president of sales for Kelvinator. Jeffrey, formerly vice president in charge of sales, assumes overall management of Kelvinator. Travis was formerly general sales manager and is succeeded by Edmund B. Barnes, merchandise manager.

MITCHELL UPS SCIRE, DIGIOIA

Frank J. Scire has been advanced from chief engineer to director of engineering, and Louis DiGioia has been named chief mechanical engineer of Mitchell Mfg. Co., Chicago, announced President J. W. Alsdorf. DiGioia was formerly in the experimental and research department.

AMANA BUYS DEEPFREEZE DIV.

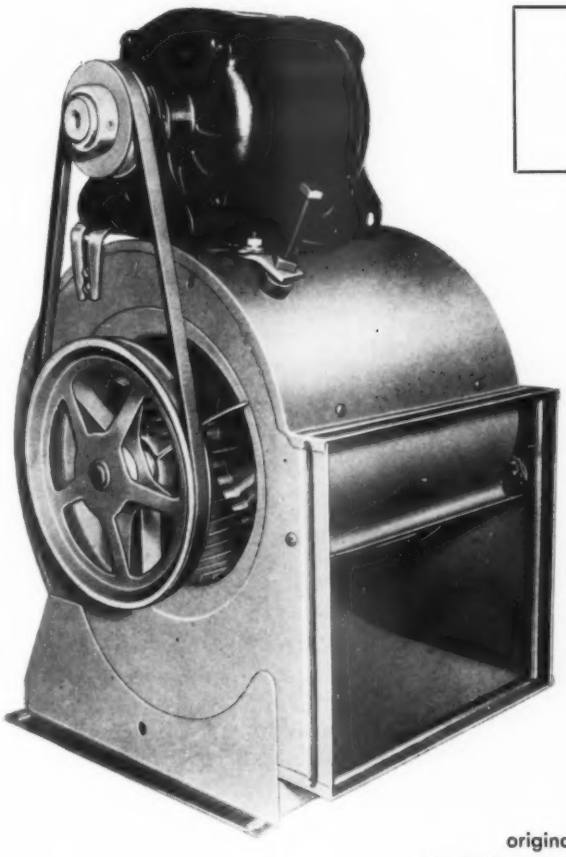
Amana (Ia.) Refrigeration, Inc., has acquired the trade name, all tools, dies and patents of Deepfreeze Appliance Div. of Motor Products Corp., Chicago, Ill., announces George C. Foerstner, Amana executive vice president. No real estate was involved in the transaction. Foerstner also announced plans for the establishment of the Deepfreeze Div. of Amana, to produce and market a line of chest freezers.

4-MONTH HOME LAUNDRY SALES ARE 11% OVER LAST YEAR

Total domestic home laundry appliance sales for the first four months of 1956 totaled 2,041,090 units, 11% over the corresponding 1955 period, reports Guenther Baumgart, executive director, American Home Laundry Manufacturers' Assn. Gas clothes dryers showed the biggest gain, with a 24% increase over last year.

SAVES DOLLARS

While It Gives Unbeatable Performance!



This Is The Experience Mitchell Manufacturing Company Has Had With Lau Series "A" Blowers

And Mitchell Manufacturing Company is no different from scores of other leading makers of original equipment!

Lau economy is designed into the product — and so is Lau performance. Series "A" is the all-time outstanding achievement in the blower field. Many of its revolutionary features are exclusive with Lau . . . many of them pioneered by Lau.

This basic component comes ready for incorporation in Mitchell Manufacturing equipment, thus cutting inventory and handling costs.

The Series "A" entire unit is die formed — lending itself to mass production on precision-built equipment with reflected low costs.

The housing unit, of heavy gauge steel, is an original design by Lau, and has set the standard for the industry. The housing support is welded to the body of the unit in order to give maximum rigidity, allowing Mitchell Manufacturing to assemble blower in their product and ship with minimum in-transit loss.

Our exclusive Lau-pak Gold Seal Bearings are lifetime lubricated and sealed; no oil cups, no oil tubes and NO servicing. Our Motor Mounting Bracket is the most flexible mounting ever built . . . with a patented feature of complete adjustability for mounting motor clockwise or counter-clockwise without removing the mounting.

See the Lau representative about your air-moving problem.

LAU

THE LAU BLOWER COMPANY

World's Largest Manufacturer of Air-Conditioning Blowers

DAYTON 7, OHIO

PROMOTIONAL PLANS REVIEW IS HIGHLIGHT OF SKCMA GREENBRIER MEET; PLANS LAID FOR SEPTEMBER STEEL KITCHEN CABINET MONTH

A complete review of promotional plans for 1956 was the highlight of the annual meeting of the Steel Kitchen Cabinet Manufacturers Association just completed at the Greenbrier, White Sulphur Springs, W. Va. A presentation of the recent Kitchen Call promotion for Steel Cabinets by U. S. Steel Corporation and an outline of the Association program for September Steel Kitchen Cabinet Month were featured.

Newly elected President of SKCMA is R. A. MacNeille, President of St. Charles Manufacturing Co., St. Charles, Ill. Vice President is C. K. Reynolds, Jr., Manager of Steel Kitchen Sales, Republic Steel Corp., Canton, Ohio.

Serving on the Board of Directors, in addition to the officers, will be: C. D. Alderman, Vice President-Sales, Youngstown Kitchens, Salem, Ohio; Marvin J. Berz, President, Marvel Metal Products Co., Chicago, Ill.; F. M. Crook, President, Toledo Desk & Fixture Corp., Maumee, Ohio; Guy Curtis, General Sales Mgr., Kaiser Metal Products, Bristol, Penn.; F. E. O'Connor, Vice President-General Mgr., Geneva Modern Kitchens, Geneva, Ill.; and M. W. Pender, Ass't. General Mgr., American Kitchens Div. Avco, Connersville, Ind. Arthur J. Tuscany, Jr. of Cleveland, Ohio is Executive Secretary-Treasurer.

E. E. Bang, Chairman of the Sales Promotion Committee and Advertising Manager of Republic Steel, Berger Division, reported that the September event would feature coordinated industry advertising, dealer display kits, and a special tabloid newspaper supplement. George C. Shenk, Project Manager of U. S. Steel Corporation, indicated the broad coverage by newspaper, magazine, radio and TV that resulted from their promotion "The Call is for Kitchens, Styled in Steel". Other Committee reports were given by A. C. Deimel, Traffic Committee Chairman, and General Traffic Manager of Youngstown Kitchens; Paul Vignos, Technical Committee Chairman and Chief Engineer of Republic Steel, Berger Division, and J. R. Miller, Statistics Committee Chairman and Manager of Kitchen Products for American-Standard. Winner of the annual golf tournament and trophy was C. R. Lucy, Manager of Sales Requirements for Youngstown Kitchens. F. E. O'Connor was toastmaster at the annual banquet.

Group attending SKCMA *annual meet included: (1st Row) A. C. Deimel, Youngstown Kitchens; C. K. Reynolds, Jr., Republic Steel, Berger Div.; H. S. Lawrence, Capitol Kitchens; Incoming President R. A. MacNeille, St. Charles Manufacturing Co., and Arthur J. Tuscany, Jr., SKCMA. (2nd Row) Paul Vignos, Republic Steel, Berger Div.; Leonard B. Rhodes, Lyon Metal Products; C. Fred Hastings, American Kitchens Div. Avco; C. R. Lucy, Youngstown Kitchens; R. W. Sponholtz, Geneva Modern Kitchens; C. W. Stoup, American Kitchens Div. Avco, and Donald R. Barber, Geneva Modern Kitchens. (3rd Row) J. B. Johnson, Kelvinator Div. of American Motors; Geo. C. Shenk, U. S. Steel Corp.; K. O. Dupree, American Kitchens Div. Avco; Marvin J. Berz, Marvel Metal Products Co.; J. R. Miller, American Radiator-Standard, and R. A. Sweeney, General Electric Co. (4th Row) Guy Curtis, Kaiser Metal Products; Victor C. Petchul, Appliance Manufacturer; C. H. Menge, Murray Corp.; H. C. Filbert and M. M. Miller, Beautycraft Kitchens; F. E. O'Connor, Geneva Modern Kitchens, and E. E. Bang, Republic Steel.*

BISBEE CITED BY PEI FOR SAFE TRANSIT WORK

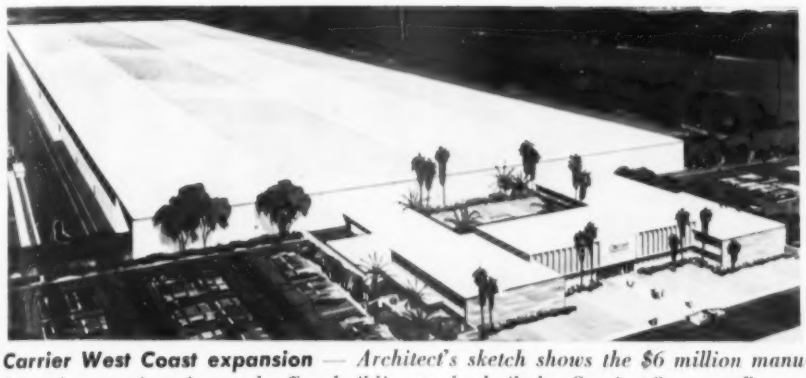
R. F. Bisbee, manager of quality control for Westinghouse Electric Appliance Divisions, has been cited by the Porcelain Enamel Institute for "his outstanding contribution to American Industry as Chairman of the National Safe Transit Committee." With Bisbee as chairman, this committee established a pre-shipping testing procedure accepted as a national standard by industry and carriers. Pictured here, Glenn Hutt, (left) PEI president, presents Bisbee with a watch and a plaque during a luncheon paying tribute to Bisbee, held at the Mansfield-Leland hotel, Mansfield, Ohio.

CHAMBERS OPENS NEW PLANT

The Chambers Mfg. Corp. has opened a million dollar facility at Oxford, Miss., to manufacture gas and electric cooking equipment. All Chambers ranges, including the console and built-in gas and electric lines, will be made eventually at the 100,000 square foot plant. Previously, company products were manufactured at Shelbyville, Ind. The new facility includes a separate office building with 3,000 square feet of space. One feature of the plant is a radiant tube gas-fired enamel furnace used in applying porcelain enamel to steel. The 60 foot long furnace weighs 162,000 pounds.

342,018 ELECTRIC RANGES SOLD IN FIRST QUARTER

The National Electrical Manufacturers Assn. has released the following sales figures for electrical appliances during the first three months of 1956: ranges, 342,018; household refrigerators and freezers, 886,866; storage water heaters, 167,329; and farm and home freezers, 156,143.



***Carrier West Coast expansion** — Architect's sketch shows the $6 million manufacturing, engineering and office building to be built by Carrier Corp. at Puente, Calif., for the Day & Night and Payne Divs. The plant will be used to produce air conditioning equipment, furnaces and water heaters.*

SIEGLER PLANS TO ACQUIRE GENERAL WATER HEATER CORP.

Siegler Corp., Chicago, announces it has entered into agreement to acquire General Water Heater Corp., Burbank, Calif. General Water Heater and subsidiaries produce gas water heaters, wall heaters, forced air furnaces and home and professional power tools.

WESTINGHOUSE APPOINTS ANDERSON, STEPHENSON

The appointment of John J. Anderson as manager of the Westinghouse ma-

STEPHENSON

jor appliance division has been announced by John W. Craig, Westinghouse vice president and general manager of the electric appliance divisions. S. J. Stephenson was named successor to Anderson as manager of the portable appliance divisions. Anderson succeeds R. J. Sargent, who was appointed general manager of marketing and distribution for consumer products divisions.

4-MONTH GAS BOILER SHIPMENTS UP 39.9%

Shipments of gas-fired boiler units during the first four months of 1956 totaled 24,200 units, 39.9% over the same period in 1955, according to the Gas Appliance Manufacturers Assn.

At a recent meeting of the boiler division of GAMA, chairman Norman E. Westphal, reported that the increase wouldn't have been possible without product improvement, home builder support, and the cooperation of utilities which are distributing ever-increasing quantities of natural gas. Gas-fired boiler units, he said, which are proving popular with builders of split-level and ranch houses, and the expanding home improvement market, coupled with the extension of natural gas pipe lines, are providing that increased market.

GAMA also reported that shipments of gas furnaces, forced warm air and gravity types, were up 8% in the first four months, automatic gas water heater shipments were up 2.7%, and gas ranges, down 9.6%.

NST MEMBERS TOTAL 227; 51ST LABORATORY CERTIFIED

The number of member companies of the National Safe Transit Program has been increased to 227, with the recent certification of the following six companies: Southern Porcelain Co., Inc., Dallas Texas; Ditto, Inc., Chicago, Ill., Mitchell Mfg. Co., Chicago, The Torrington Mfg. Co., Torrington, Conn., Ideal Dispenser Co., Bloomington, Ill., and Hough Mfg. Corp., Janesville, Wis. Hinde and Dauch Paper Co. of Canada, Ltd., Toronto, Ontario, is the 51st certified laboratory.

APRIL VACUUM CLEANER SALES UP 45.9% OVER APRIL 1955

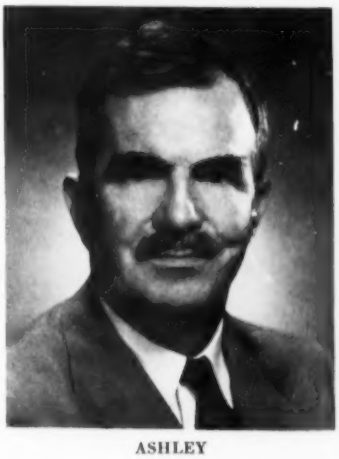
April sales of household vacuum cleaners totaled 352,875 units, up 45.9% over 241,870 cleaners in April 1955, according to Vacuum Cleaner Manufacturers' Assn. This was the 21st consecutive month in which the industry has reported record business.

JOHN WOOD CO. ENTERS HEATING, COOLING FIELD

The John Wood Co., Conshohocken, Penn., has entered the heating and air conditioning field by the purchase of the Fluid Heat Div. of Anchor Post Products, Inc., Baltimore, according to J. B. Balmer, John Wood president. The company plans to market a line of furnaces and conversion burners for gas and oil and summer air conditioning units.

ASHLEY, PALMATIER TO KEY ENGINEERING SOCIETY POSTS

Carlyle M. Ashley, chief staff engineer at Carrier Corp., Syracuse, N. Y.,



ASHLEY

has been named president of the American Society of Refrigerating Engineers. Everett Palmatier, Carrier's director of research, has been elected to the society's board of directors. Ashley is an authority in the refrigeration and air conditioning engineering fields and is responsible for more than 40 patents. Palmatier has authored several articles and books on thermodynamics and psychrometrics and their application to centrifugal and residential air conditioning.

CLOUD WAMPLER SEES RECORD CENTRAL CONDITIONER SALES

Cloud Wampler, chairman of the board of Carrier Corp., Syracuse, N. Y., has reaffirmed his prediction that 1956 will be a record breaking year in central air conditioning sales. His observation is based on 1956 sales to date. Carrier four-month sales are 50% ahead of the first four months of 1955. Wampler cited, as a major factor, the increasing adaptation of heating systems in existing residences to air conditioning. An analysis this year showed that three out of every four Weathermaker home installations use air-cooled or "waterless" refrigeration, he reported.

D-ENAMELING

is more economical than ever...

Once D-Enameling was a temporary expedient which appliance manufacturers used to stretch critical steel supplies, but that day is gone! Now, America's leading appliance manufacturers consider D-Enameling a permanent part of their manufacturing picture. D-Enameling has come of age . . . has assumed its role as a routine step in appliance manufacturing. The reason is simple — D-Enameling transforms scrap loss into profit dollars.

THESE INDUSTRY LEADERS KNOW FROM EXPERIENCE THAT D-ENAMELING TRANSFORMS SCRAP LOSS INTO PROFIT DOLLARS

AIRLINES

HOME LAUNDRY APPLIANCE MANUFACTURERS

JOB ENAMELING PLANTS

RANGE MANUFACTURERS

REFRIGERATOR MANUFACTURERS

SANITARY WARE MANUFACTURERS

SIGN MANUFACTURERS

SPACE HEATER MANUFACTURERS

WATER HEATER MANUFACTURERS

**D-Enameling is a patented process.*

New Process *D-Enameling* Corp.

Highland and New Haven Avenues • Aurora, Illinois

'57 NAT'L. ELECTRICAL WEEK SET FOR FEBRUARY 10-16

National Electrical Week, promoted for the first time as an all-industry event, will be observed in 1957 from February 10-16, M. E. Skinner, chairman of the National Electrical Week Committee and vice president of Union Electric Co. of Missouri, has announced. Current sponsors of the observance are: Air-Conditioning and Refrigeration Institute, Edison Electric Institute, International Assn. of Electrical Inspectors, International Assn. of Electrical Leagues, Nat'l. Appliance and Radio-TV Dealers Assn., Nat'l. Assn. of Electrical Distributors, Nat'l Electrical Contractors Assn., Nat'l. Electrical Manufacturers Assn.

PEI PUBLISHES PROCEEDINGS OF 17TH SHOP PRACTICE FORUM

The proceedings of the Porcelain Enamel Institute's 17th Shop Practice Forum have been published in a 174 page book. The published proceedings of the Sept. 1955 Forum, reveal many new operational developments and solutions to plant problems. Some of the subjects discussed include methods for applying porcelain enamel on aluminum, processing techniques, architectural porcelain enamel developments and color in porcelain enamel. Copies are available at $5.00 per copy from the Institute, 1145 Nineteenth Street, N. W., Washington, D.C.

MULHERN, BOGGS NAMED DIRECTORS OF VCMA

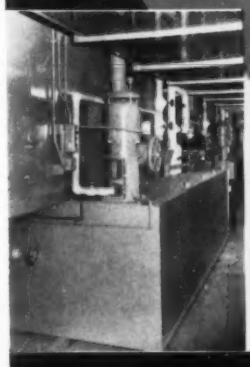
Edward F. Mulhern, president, Birtman Electric Co., Chicago, and Paul Boggs, vice president, Electrolux Corp., New York City, have been made directors of the Vacuum Cleaner Manufacturers' Assn. to succeed Richard J. Simmons, retired, and the late Mart Manley. The announcement was made by Oscar M. Mansager, executive vice president of the Hoover Co. and VCMA president. The Royal Appliance Mfg. Co., Cleveland, has been made a member of the association.

GLAMAN JOINS NST STAFF

Paul T. Glaman has joined the staff of the National Safe Transit Committee, John C. Oliver, committee secretary and managing director of the Porcelain Enamel Institute, the sponsoring organization, has announced. Glaman, formerly with the American Automobile Assn., will aid in developing and carrying out a new program of expansion extending NST services to new industries.

CHOICE OF LEADING APPLIANCE AND METAL PRODUCT MANUFACTURERS

ROSS PAINT FINISHING SYSTEMS

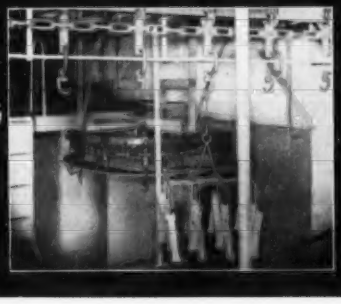


Left: Looking towards entrance end of ROSS Washer

Right: Interior of ROSS Flo-Coat Drip Tunnel

Below: Work leaving Washer to enter ROSS Dry-Off Oven

WASHING
PHOSPHATIZING
SPRAY BOOTHS



FLO-COAT
DRYING
BAKING
CONVEYING

Complete Coordination Of All Components

For every step in the process from the phosphatizing to the drying, ROSS units embody the most advanced principles of design and construction. Besides being each correctly balanced for proper performance, ROSS units are carefully planned to save space, fuel, labor and maintenance. Your entire finishing line is installed by ROSS under a single responsibility for attaining desired results.

For Detailed Information On Individual Units Or Complete Systems, Write For This New Bulletin 55-F.

J. O. ROSS ENGINEERING CORPORATION

Main Office: 444 MADISON AVE., NEW YORK 22, N. Y.

Atlanta • Boston • Chicago • Detroit • Los Angeles • Seattle

ROSS ENGINEERING OF CANADA, LIMITED, MONTREAL, CANADA
CARRIER-ROSS ENGINEERING COMPANY, LIMITED, LONDON, ENGLAND

THERE IS A BETTER WAY TO GET LIFETIME PROTECTION AGAINST RUST... USE DETREX Paintbond®

Corrosion is the arch enemy of your product's paint finish . . . it is the direct cause of peeling, flaking and unsightly stains. With Paintbond you can effectively (and economically) foil the demon rust for a lifetime regardless of the conditions under which the product is normally used!

Paintbond is a zinc-iron phosphate coating, applied directly to the metal prior to painting. Applied by either dip or spray, Paintbond provides a moisture-proof fine-grain crystalline coating which is chemically interlocked with the metal surface. When paint is applied over it, the paint flows into the microscopic crevices between the crystals and is securely interlocked with the metal.

Paintbond thus puts an end to peeling and flaking, thoroughly seals the metal from moisture. Even when the paint is scratched through, Paintbond confines rust to the exposed metal only! No more spreading rust or ugly stains around the scratch.

Important, too, is the fact that Paintbond will impart a far more lustrous, attractive surface to your paint finish and thus increase sales appeal as well.

If you paint your product it will pay you to investigate the advantages of Paintbond. Mail the coupon below or call the nearest Detrex sales office for full particulars.

☐ Send me complete information on Detrex Paintbond.

NAME_____

COMPANY_____

ADDRESS_____

CITY_____ ZONE____ STATE_____

DETREX CORPORATION DEPT. A-407
BOX 501, DETROIT 32, MICH.

DEGREASERS • DEGREASING SOLVENTS • WASHERS • ALKALI AND EMULSION CLEANERS • PHOSPHATE COATING PROCESSES

STAINLESS STEEL CONTINUED

→ *from Page 41*

ing operations, soldering, spot welding, stamping, polishing, flash plating.

In most cases, the higher strength of Cr-Ni-Mn steels will have an almost unnoticeable effect on production operations. Embossing operations, however, show the effect of working a harder, stiffer metal. Some clarity may be lost in the deeper areas indicating a need to cut the embossing dies deeper to obtain better definition.

Welding characteristics

Considerable test and production welding of the Cr-Ni-Mn steels proves them to have much the same welding characteristics as the Cr-Ni grades. Some test results indicate a reduced tendency toward intergranular precipitation of chromium carbide.

All welding techniques commonly used for stainless steels have been investigated and the Cr-Ni-Mn steels can be used interchangeably with Cr-Ni steels, in this respect. When filler wire or electrodes are used, they can be of either conventional chromium-nickel analyses or Cr-Ni-Mn analysis to match the base composition since these are now being made available.

There has not been a single unsuccessful application of Cr-Ni- Mn steels discovered to date, and many estimates place eventual use of these steels at 75 to 80 per cent of the applications now employing Types 301 and 302. The slightly lower corrosion resistance of these steels may limit their application where resistance to pitting from certain chloride compounds is needed or in other places where the use of Types 301 and 302 is marginal.

General opinion at present runs along the lines — Type 201 may be used in existing Type 301 application — Type 202 may be used on existing Type 302 application — If Type 304 or better is actually required by service, do not use the Cr-Ni-Mn types.

Fabricators cooperate

A number of fabricators have been impressed by the efforts of the stainless steel producers to alleviate the current shortage of nickel by establishing the low nickel grades. They have cooperated freely in the trial applications of these steels.

Of concern to a number of manufacturers is the customer acceptance of the Cr-Ni-Mn steels particularly in those areas where "18-8" has been established as standard and specified as such. For this reason, it is felt important by some that Type 201 and 202 stainless be treated as a "new family of stainless steels" and not merely emergency substitutes for "18-8". The properties and characteristics of the 200 grades provide a sound basis for this contention.

• INDUSTRIAL OVENS
• DUST COLLECTORS
• SPRAY BOOTHS
• PARTS WASHERS

EST. 1912

SPRAY BOOTHS

Newcomb Spray Booths are adaptable to manual, automatic, and electrostatic spray operations—floor or overhead conveying. Designed for minimum maintenance. Individual tanks or central sludge systems. Automatic sludge recovery systems.

Dip coating and Flow coating systems complete with ventilated drip areas and complete fire protection.

For Bulletins and Quotations, write to:

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Easy to Get—

the RIGHT *Data*
the RIGHT *Ideas*
about YOUR

MINIATURE LIGHTING NEEDS

Here's the *scientific* way to approach Miniature Lighting. Just fill in basic questions on Drake's new PROJECT DATA SHEET, and mail it back. Our expert engineers will scientifically analyze your data . . from all the thousands of possible lighting arrangements, will recommend the *one best* for top results, greatest economy, in *your* specific case. Drake's decades of specialized Miniature Lighting experience, and complete line of regular and special units, are thus at your disposal. *This service is free—no obligation.*

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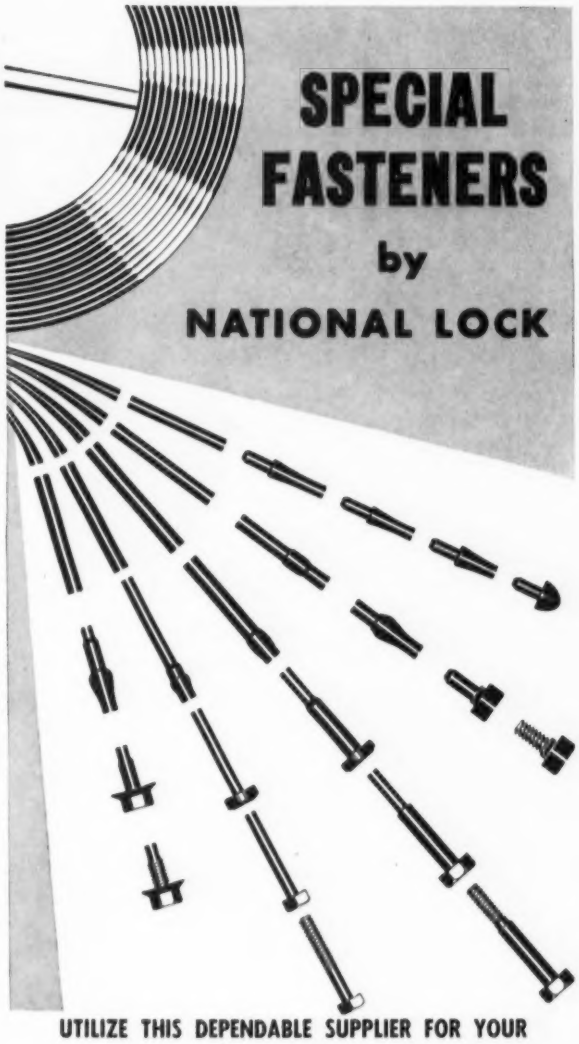
SOCKET & JEWEL LIGHT ASSEMBLIES



SPECIAL FASTENERS by NATIONAL LOCK

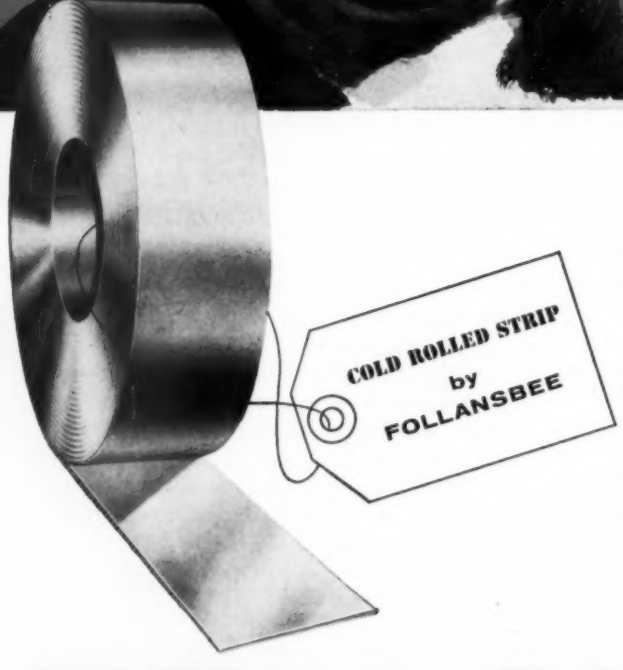
UTILIZE THIS DEPENDABLE SUPPLIER FOR YOUR STANDARD AND SPECIAL-PURPOSE FASTENERS

Whether your "specs" call for fasteners of special lengths, types, materials and finishes, or whether your requirements dictate strict adherence to tight delivery schedules, you'll find the solution to your problem in National Lock. Here extensive research, engineering and production facilities are combined to supply uniform-quality fasteners of every description . . . on time. Call upon National Lock to work with you in developing such other hardware as handles, hinges, catches, pulls, locks, casters and knobs . . . in die cast, stampings, compression and injection molding. Write us for full information.

QUALITY HARDWARE **. . . all from 1 source**

NATIONAL LOCK COMPANY

Rockford, Illinois • Fastener Division



* including both plant and office personnel.

This amazing record of 24.6 years average service by plant *and* office personnel represents the skill and experience that produces the famous quality of Follansbee cold rolled strip.

Top quality control engineers guide this unmatched skill to obtain a product that meets rigid specifications—theirs *and yours.*

Add to this the service your Follansbee representative stands ready to give you and you'll realize why more and more manufacturers are turning to Follansbee for their cold rolled strip requirements.

FOLLANSBEE

STEEL CORPORATION

FOLLANSBEE, WEST VIRGINIA

Cold Rolled Strip • Seamless Terne Roll Roofing • Polished Blue Sheets and Coils

Sales Offices in Principal Cities

New Supplies and Equipment

G-10. Coated abrasive wheels

NEW A line of small wheels designed for polishing metal with portable hand tools has been announced. The wheels are composed of

die-cut pieces of coated abrasive cloth, bonded with resin and locked into a hub. They are suited for work in the appliance, stainless and sheet steel fabricating, metal polishing, plating and tool and die industries replacing small set-up wheels.

G-11. Coating for corrugated interior packaging

NEW A coating for corrugated interior packaging which protects finished metal surfaces from abrasion damage without leaving a waxy deposit has been developed. The coating replaces conventional paraffin-base wax on inner surfaces of corrugated pads where they touch finished metal surfaces, especially baked synthetic enamel and stainless steel. It either makes no deposit at all or leaves only a fine white powder which can be wiped off instantly with a bare hand or cloth.

G-12. Temporary protective coatings

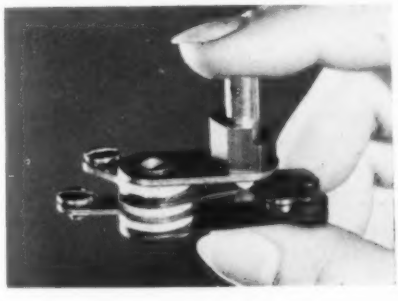
NEW A liquid plastic which on drying forms a tough, flexible strippable film has been announced. It protects metal surfaces during manufacture and fabrication and has proven valuable in operations such as stamping, drawing, bending and forming, by preventing scratches, dye marks and other damage. Also announced is a water base liquid plastic which forms a tough abrasion resistant, flexible film with high adhesion to polished surfaces. Another liquid plastic is used for maintaining and cleaning spray booths and spray areas.

More Information

For more information on new supplies, equipment and literature reviewed here, write to us on your company stationery.

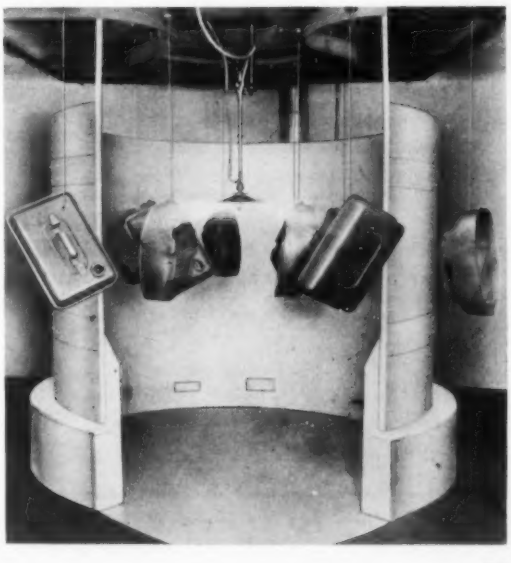
G-13. Snap-action thermostat

NEW A thermostat designed for appliances requiring positive "snap-action" at predetermined temperature is available. It will "remake" with a predetermined differential. The quick thermal response of the thermostat is said to make it suitable for heat control on air conditioners, room heaters, coffee makers, broilers, hot water heaters or any appliance calling for sensitive, accurate temperature control.



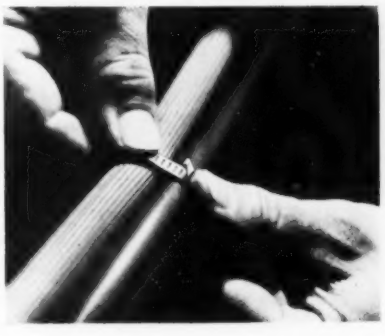
G-14. Electrostatic spray system

NEW An "Ionic" electrostatic spray system which features the patented "Ionic Gun" has been introduced. The system utilizes a conveyor which forms almost a complete closed loop around the "Ionic Gun". A cone of disc shaped ionizing electrode is attached to the "Atomic Nozzle" on the gun. The spray pattern is set so that the spray will hit the electrode and deflect off of same in the form of a "mist". This ionized "mist" is attracted to the work being processed.



G-15. Re-usable metal hose strap

NEW An inexpensive, re-usable, spark-proof metal strap that quickly and easily snaps around standard size air and fluid hoses used in spray painting is being offered. The strap locks the two hoses into a single unit in a matter of seconds; twisting and



kinking are reduced. This new hose strap is designed to take the place of the tape and wire frequently used to fasten hoses together. It holds tight, but can be undone quickly and used several times. It will not snag hands or clothes or cause sparks when it strikes another metal or is dragged across the cement floor.

NEW Industrial Literature

723. Mill addition opacifier

New Trial quantities of a mill addition opacifier are available on request. According to the manufacturer, this product seems to give enamel unusual working properties.

711. Electrostatic finishing

New A case history file is now available which contains information about an electrostatic finishing system. It is said to contain positive evidence that this system can help reduce finishing costs.

712. "Chemical Finishing of Metals"

New The booklet, "Chemical Finishing of Metals", contains information to help design engineers and purchasing agents find ways to cut manufacturing costs through substitution of low-cost, "treated" base metals and replacement of expensive plating operations. The booklet describes aluminum anodizing and alodizing.

713. Bulletin on "Ribbon Burners

New An 8 page color bulletin on "Ribbon Burners" is available. These ribbon burners are specially designed gas-fired heating units which produce a narrow, uniform sheet or "ribbon" of flame. They are employed in continuous heat processing applications in the metal fabricating and wire industries.

714. Bulletin on industrial dryers

New A bulletin describing and illustrating a line of industrial dryers is available. These dryers are designed for the source of heat suitable to the particular problem: oil or gas, direct or indirect, electricity or steam.

715. Introduction to Printed Circuitry

New If you are in the electronics business to stay, be you hot plate manufacturer or maker of the most intricate of electronic devices, either you are now using printed circuitry or eventually you will be using it. Facilities are now available to provide you with from engineering and planning completely through the finishing of printed circuitry tailored to your particular needs. Besides outlining the facilities available for producing printed circuitry by laboratory approved processes, a new brochure also offers recommendations on basic steps necessary for exact circuit duplication.

716. Catalog on screws

New A catalog on a line of screws is available. Included are photos of the screws, dimensions and prices. Types include stove bolts, machine screws, tapping screws and carriage bolts. All are available in steel and some in brass, aluminum and stainless steel also.

717. Coil precoated metals

New A brochure on coiled precoated metals along with sample coatings is now being offered free upon request, which show how you can form, blank draw, crimp, emboss or press brake these metals. One or both sides can be coated in the same or different colors, the supplier asserts, and the metals lend themselves to nearly every type of finish, including lacquers, alkyds, epoxy, chemical finishes and vinyls.

718. Control and transfer switches bulletin

New A 28-page bulletin covers a line of control and transfer switches for low voltage applications up to 600 volts AC or DC. It includes photos, drawings and discussion of special features. Switches with water-tight and explosion-proof housings are described.

719. Expendable pallets pamphlet

New "What You Should Know About Expendable Pallets" is intended as a guide to pallet purchases in determining the important principles involved in the construction and use of wooden expendable pallets. It includes data on the types of expendable pallets, construction standards for pallet parts and fastenings and allowable tolerances. It also provides an Application Rule for the use of expendable pallets and a list of definitions and terms.

720. Prefinished steel

New Prefinished steel—chromium, nickel, brass and copper finished — polished or satin, is now available in plane, striped or dimensional patterns. It is especially suitable for trim or functional parts of major appliances and small appliances, such as toasters, table broilers, etc.

721. Selection guide for colored stitching wire

New A color selection guide for colored stitching wire is available. The chart contains 12 color chips which can be used to match or harmonize with colors of fibre display or shipping boxes. Its vinyl paint finish is bonded to the wire and is resistant to chipping and peeling.

710. Bulletin on small press brake

New A 4-page bulletin illustrates and describes the design and construction features, with complete specifications, of an 11-ton capacity press brake.

722. Perforated Metal Pattern Booklet

New A six page brochure showing the latest in stock industrial and decorative perforated metal sheets is being offered. Data on sheet sizes, type and gauge of metal, open area percentage is given. Perforated patterns are illustrated in actual size. An excellent idea booklet for improvement in products, both decorative and functional, the six page brochure with its detailed art, is of value to designers or stylists in the appliance and metal products industry as well as to architects, building contractors, and other metal fabricators.

724. Standard terms for power actuated valves

New A 12-page booklet, "Standard Classification and Terminology for Power Actuated Valves" is intended to provide a practical framework of standard terms for operating engineers, instrument engineers and mechanics. It is expected to clear up existing uncertaintities and provide a broad base for new and accepted names and terms.

FOR MORE INFORMATION, WRITE TO THE FINISH READER SERVICE EDITOR

you are worrying
about Satisfactory
Enameling Results
with Non premium Steel....

ING-RICH

can bring you...
Definite Proof *that it can be done!*

Ing-Rich ceramic engineers, working with our enameling plant technicians, have developed frits which are providing highly satisfactory enameling results at 1250 to 1300 degrees at conventional chain speed.

If you are facing the problem of the use of nonpremium steel, it might prove very helpful to at least listen to our factual story of success which came as a result of Ing-Rich practical "Know-How." No obligation of course.

INGRAM-RICHARDSON, INC.

OFFICES, LABORATORY AND PLANT, FRANKFORT, INDIANA

ING-RICH
FRIT
"The Plant Tested Frit"

The answer to a tough finishing problem on JAMESWAY incubators:

James Mfg. Co., Ft. Atkinson, Wis., Los Angeles, Calif., Elmira, New York

Guardsman®
CHEMGARD and GLOGARD

Commercial hatchery incubators stand idle much of the year in unheated rooms that are often damp. These conditions create a serious corrosion problem unless units are properly finished. The James Manufacturing Company ended its search for the right finish with this 2-coat baking system:

CHEMGARD PRIMER	
TYPE	Epon
COLOR	Gray
APPLICATION	Spray (reduce 5 parts primer with 1 part special reducer)
BAKE	20 min. at 375°
HIDING	Fair, not solid
GLOSS	80
FLOWING	Excellent
ADHESION	Excellent
FLEXIBILITY	Excellent
TOUGHNESS	Excellent
HUMIDITY RESISTANCE	Excellent
DETERGENT RESISTANCE	Excellent

GLOGARD ENAMEL	
TYPE	Alkyd-amino resin
COLOR	White
APPLICATION	Spray (reduce 5 parts enamel with 1 part SC #2 or Xylol)
BAKE	30 min. at 300° or 20 min. at 325°
HIDING	Solid, 1 coat over primer
GLOSS	85
FLOWING	Good
ADHESION	Good
FLEXIBILITY	Good
HARDNESS	HB pencil
HUMIDITY RESISTANCE	Good
DETERGENT RESISTANCE	Good
COLOR RETENTION	Good

GRAND RAPIDS VARNISH CORPORATION

GRAND RAPIDS, MICHIGAN

Makers of the Famous Guardsman® Finish and Guardsman® Cleaning Polish

NEWS about Suppliers

BEVIS, POSNICK TO FERRO LATIN AMERICAN POSTS

Ralph E. Bevis has been appointed director of Latin American operations for Ferro Corp., Cleveland, and Ad Posnick, appointed managing director of Ferro-Brazil, announces C. D. Clawson, president. Bevis will be in charge of Latin American plants, Brazil, Chile, Mexico and Argentina. He was formerly manager of the International Div. Posnick was previously technical manager for Ferro-Brazil.

BLOOM TO SELCK SALES STAFF

David J. Broderick, vice president, has announced the appointment of Robert W. Bloom to the distributor sales department of Walter E. Selck & Co. Bloom has had sales experience with Johnson Wax and Wycoff Sales Co.

DRURY IS REDMOND VP

Robert E. Drury has been elected vice president and assistant secretary of Redmond Motor Co., Owosso, Mich. According to J. W. Tweedy, president, Drury will continue to be director of manufacturing.

GOETZ NAMED ATLAS PLYWOOD VICE PRESIDENT

John W. Goetz, Jr. has joined Atlas Plywood Corp. in the newly-created position of vice president in charge of warehousing, announced Bert Cole, senior vice president. Goetz was most recently metropolitan division manager in New York for the Georgia Pacific Plywood Co.

NEW SPEED-D-BURR PLANT

Ground has been acquired for the construction of a new factory for Speed-D-Burr Corp., Glendale, Calif., according to Haskell J. Miller, president. The new plant, costing more than $250,000 will be located in Los Angeles and will more than triple present manufacturing facilities.

AMERICAN BRASS TO BUILD $25,000,000 ALUMINUM MILL

Ground-breaking ceremonies have been held at the plant site of American Brass Co.'s integrated aluminum mill at Terre Haute, Ind. James F. Ackerman, formerly vice president of the Torrington, Conn., division, will be in charge of the new facility. Production at the plant will include casting of aluminum ingots and billets, rolling of sheet and strip, and extrusion of tubes, rods and special shapes. The plant will be completed in 1957.

MANSFIELD IS SORENG VP & MANUFACTURING DIRECTOR

Willis W. Mansfield has been elected vice president and director of manufacturing for Soreng Div., Controls Corp. of America, Schiller Park, Ill., announced Louis Putze, president.

Mansfield was associated with Penn Controls before joining Soreng.

PENNSALT NAMES KLINE

Richard H. Kline has been added to Pennsylvania Salt Mfg. Co.'s Metal Processing Dept. sales staff in Detroit, Sales Manager John M. Davidson has announced. Kline was formerly a salesman for Sun Oil Co.

WABASH FIBRE OPENS NEW CHICAGO PLANT

More than 500 representatives of the Chicago Industrial area attended the recent opening of Wabash Fibre Box Co.'s new Chicago plant at 6850 West 62nd Street. The guests were greeted by Ward S. Hubbard, president, and taken on a plant tour.

One hundred thousand square feet of the plant will be used to manufacture corrugated containers and will increase total corrugated box production by 480,000,000 square feet a year. In addition, 30,000 square feet will be used for office space, designing department, etc.

EDMONDSON HEADS SHAKEPROOF EASTERN DISTRICT SALES

Charles W. Edmondson has been named sales manager of the eastern district by Shakeproof Div. of Illinois Tool Works, Elgin, Ill., according to Russell W. Bill, Shakeproof's general marketing manager. Edmondson succeeds Wesley R. Johnson, who has been named managing director of Illinois Tool-Shakeproof Ltd., London, England, a newly organized subsidiary.

IMPACT EXTRUSIONS, INC., ENTERS SUPPLIER FIELD

Production of impact extrusions has started at a new firm, Impact Extrusions, Inc., in Valparaiso, Ind. Nolan E. McDonald is president and general manager of the $150,000 company. The first products to be made by the firm will be aluminum components for the automotive, appliance and aircraft industries. Before organizing the company, McDonald was impact extrusions division manager for Magnesium Co. of America.

ROBERTSHAW-FULTON APPOINTS TURNER TO SALES POST

James R. Turner has been appointed district sales manager of the cooking appliance controls division of Robertshaw-Fulton Controls Co., announced Charles M. Stainton, vice president and director of sales. Turner will be in charge of sales in Washington, Oregon, Nevada, Montana, Idaho, Wyoming and Northern California.

PEMCO FRIT MOVIE BIG SUCCESS

According to Thomas S. Hook, advertising manager, Pemco Corp., Baltimore, Md., over 100 companies and colleges booked the Pemco movie on frit manufacturing for showing between January 1st and June 9th.

FAHRALLOY...

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heat resisting castings have served the needs of industry for nearly a quarter century

Just recently we had occasion to take a look back over our shoulders at the years that have passed since we first started serving the needs of industry with heat resisting castings. It hardly seems possible, but nearly a quarter of a century has passed since we first opened our doors. We've made a lot of friends in that time and have gained great satisfaction from knowing that we've been able to solve a lot of stubborn problems for them. With high temperature playing an ever increasing role in our expanding industry, we find ourselves called upon more and more to solve the problems that high temperature service conditions impose. We're gratified at the confidence that the name FAHRALLOY has come to mean, and we hope that as the occasion arises you'll call on us and learn from your own personal experience that whenever the problem is heat the solution is FAHRALLOY.

THE FAHRALLOY CO.

150th & Lexington Ave. — Harvey, Illinois
In Canada — Fahralloy Canada, Ltd., Orillia, Ontario

LOHMAN IS PEMCO V P

Charles P. Lohman has been elected a vice president of Pemco Corp., Baltimore, Md., according to Richard H. Turk, board chairman. Lohman has been sales manager since 1944, and prior to that he was manager of ceramic sales for five years.

LOHMAN

WISE

WISE APPOINTED BRADY GENERAL SALES MANAGER

Thomas W. Wise has been appointed general sales manager of W. H. Brady Co., Milwaukee, Wis. He was formerly assistant to the vice president and general sales manager of Lufkin Rule Co., Saginaw, Mich.

PETERSON TO RINSHED-MASON WEST COAST SALES POST

Russell E. Petersen has been appointed industrial sales manager of the Rinshed-Mason Co.'s Anaheim, Calif., plant, announced Frederick G. Weed, president. Petersen has been associated with the paint industry on the West Coast for the past ten years.

HARVILL TO CONSTRUCT WEST COAST PLANT

Harvill Corp., Los Angeles, has announced the construction of a 125,000 sq. ft. plant that will increase production capacity by 70%. The new plant in Santa Ana will house Harvill's die casting facilities, the Tork-Master Div., and the Harv-O-Matic Div.

ROBERTSHAW-FULTON MOVES CLEVELAND OFFICES

The Cleveland offices of Robertshaw-Fulton Controls Co. have moved into new quarters at 6116 St. Clair Avenue, announced Charles M. Stainton, vice president and director of sales.

HANSON-VAN WINKLE-MUNNING NAMES WAALKES

Paul A. Waalkes has been named assistant manager of compound sales for Hanson-Van Winkle-Munning Co., Matawan, N. J., according to a recent announcement. In this capacity he will direct the program for formulating and developing metal finishing compounds at the J. C. Miller Div., Grand Rapids, Mich.

ARMOUR NAMES SPENCER DISTRICT SALES SUPERVISOR

Robert S. Spencer has been appointed Ohio district sales supervisor, Coated Abrasives Div., of Armour and Co., Alliance, Ohio. He was formerly connected with Detroit & Pittsburgh Motor Freight, Inc.

BORG-WARNER PURCHASES INDUSTRIAL CRANE & HOIST

Borg-Warner Corp., Chicago, has acquired the assets of Industrial Crane and Hoist Corp., Chicago materials handling equipment manufacturer, R. C. Ingersoll, chairman of Borg-Warner, has announced. Industrial produces overhead cranes, job and gantry cranes, hoists and trolleys, monorail systems and crane runways.

U. S. STEEL NAMES ELLIOTT, GOTT, TO TOP POSTS

J. H. Elliott has been named assistant executive vice president of operations, and E. H. Gott has been named vice president of operations-steel, United States Steel Corp. Oscar Pearson has been named general manager of operations.

AUTOMATIC SWITCH ERECTS FLORHAM PARK, N.J., PLANT

Automatic Switch Co. has announced the construction of a new plant at Florham, N. J., which will have double the capacity of the plant now located in Orange, N. J. In the 120,000 square foot building, solenoid valves and electromagnetic control will be manufactured.

HEGG IS L.O.F. GLASS FIBERS GENERAL SALES MANAGER

Clinton F. Hegg, vice president, L. O. F. Glass Fibers Co., Toledo, Ohio, has been named general sales manager, according to R. H. Barnard, president. He was formerly in charge of the automotive sales division. Hegg replaces J. M. Johns, resigned.

SEIDEL IS HONEYWELL VP

Glenn E. Seidel has been appointed to the newly-created corporate position of vice president in charge of engineering for Minneapolis-Honeywell Regulator Co., Paul B. Wishart, president, announced. Seidel has been a member of Honeywell's engineering organization for nearly 14 years and since 1952 has been vice president in charge of engineering in the Minneapolis plants.

BLACK MFG. COMPANY MOVES

Black Mfg. Co., spray gun manufacturers, has expanded facilities and operations and moved to new quarters at Livingston, N. J. The company was formerly located at Harrison, N. J.

SCHIERBERG ELECTED GRANITE CITY STEEL CO. PRESIDENT

George B. Schierberg has been elected president and treasurer of Granite City Steel Co., Granite City, Ill. N. P. Veeder has been elected executive vice president; James L. Hamilton, Jr., vice president and general manager — sales; and John N. Marshall, chief executive officer and chairman of the board.

HEINTZ UPS BUTLER, THACHER

Edwin M. Butler has been named to the new position of assistant to the executive vice president of Heintz Mfg. Co., Philadelphia. He was formerly chief inspector. John H. Thacher, previously manager of quality control, has been named manager of the Quality Dept.

BUTLER

TURNER

PORCELAIN METALS NAMES TURNER GENERAL MANAGER

Porcelain Metals Corp., Louisville, Ky., has announced the appointment of W. D. Turner, formerly vice president and factory manager, to vice president and general manager. Joining Porcelain Metals in 1935, Turner has served as production manager and superintendent of both enameling and metal fabrication plants.

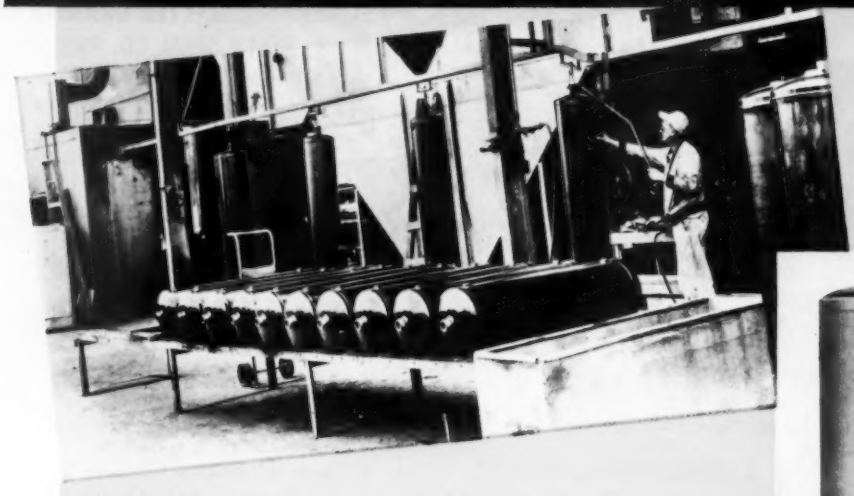
KAISER STEEL EXPANDS FONTANA, CALIF. MILL

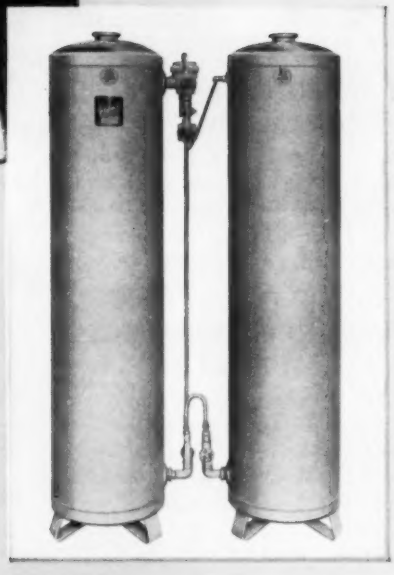
Kaiser Steel Corp. has announced a $113 million expansion of its Fontana Steel Mill near Los Angeles, according to Jack L. Ashby, vice president and general manager. Production of steel ingots and finished steel will be increased 40%.

4-MO. RESISTANCE WELDER ORDERS UP 89% OVER 1955

According to the Resistance Welder Manufacturers' Assn., new orders for the first four months of 1956 showed an increase of 89% over 1955. Shipments during the period were up 21%.

EPON® RESIN does it!





Plastic coating guards water softener tanks against corrosion

HERE'S HOW...

THE ROPER MANUFACTURING CORPORATION of El Monte, California, needed a tough, dependable anti-corrosion lining for tanks used in water treatment. They decided to test a promising coating formulated from Epon 1007 and supplied by the Trail Chemical Company of El Monte.

This Epon resin-based coating, applied to steel panels, easily survived severe tests for metal adhesion and thermal shock. Immersion tests showed that it resisted organic chlorides, detergents, salt spray and acids at both room and elevated temperatures.

Finally, two test panels were taken from an autoclave in which they had been held for two years. The first panel—coated with a high-quality porcelain—showed large rust spots, while the Epon resin-based coating on the other panel *was still intact.* Small wonder that Roper has now standardized on Epon resin-based coatings to line their water softener tanks. More than 30,000 tanks have been delivered, with no complaints to date.

If you have a product finishing problem, consider solving it with Epon resin-based coatings. They have excellent adhesion, resistance to abrasion and impact, plus the ability to withstand heat, humidity and the attack of corrosives. You can call on our sales offices for the names of Epon resin-based coating formulators. Write for your copy of "Planning to Paint a Pyramid?"

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SHELL

Porcelain enameled products to show 6½% increase in 1956, PEI's Commercial Research Committee says

1956 should be a record breaking year for the porcelain enamel industry, according to a report just released by the Commercial Research Committee of the Porcelain Enamel Institute. In analysing the general business expansion resulting from new orders put on the books in 1955, the committee projected the 1956 figures for 1956 to show new construction increases of 1¾ billion dollars. A fifteen billion dollar increase is predicted for consumer spending. The three major users of porcelain enamel, the appliance, building material and industrial equipment industries, are expecting an approximate 6½% increase in total sales of porcelain enamel products in 1956, the report reveals.

PEI conference papers now being distributed

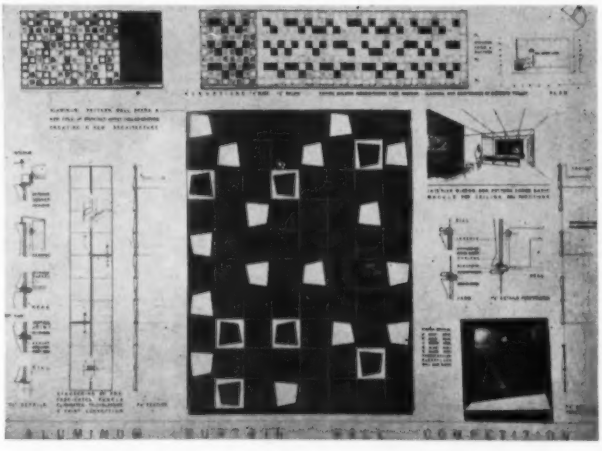
Copies of proceedings of the 2nd annual Winter conference on Architectural Porcelain Enamel are now available through the institute, Bill Brinker, head of PEI's information service, has announced. One free copy has been distributed to all member companies and to those individuals who were registered at the meet. Single copies are available at $5 per from PEI, Assns. Bldg., 1145 Nineteenth Street, Washington, D. C. Some of the topics discussed and reported in the booklet are "The Architectural Future of the Metal Curtain Wall", and "Sealing the Joints between Porcelain Enamel Panels." The papers were presented Feb. 8-9 at the Chicago meet.

Permaglas sales up for first '56 quarter

First quarter shipments of Permaglas domestic water heaters were 32 per cent over the first 1955 quarter. J. H. Brinker, Permaglas general manager, reports. Aided by March production which reached an all-time high, Brinker pointed out the part the nation-wide promotion tied to production of the 3,000,000th glasslined water heater on Feb. 14 as an assistance in the record-breaking sales. Brinker reported the biggest relative gain in February when shipments were 44.3 per cent over the same month in 1955. January was 32 per cent ahead and March 23.4 over March 1955. Also announced was the all-time high volume of sales in the first quarter of any year for the Burkay commercial water heater dept. of the Permaglas division. This included an all-time top in March.

Van Loo to be speaker At Annual Paint Meet

Maurice Van Loo, director of paint research of the Sherwin-Williams Co., has been selected to present the annual Joseph J. Mattiello Memorial Lecture at the 34th annual meeting of the Federation of Paint and Varnish Production Clubs. That meet is set for the Netherlands Plaza Hotel in Cincinnati, O., Oct. 22-24. Van Loo is the author or co-author of numerous publications in the field of physical and colloid chemistry, paint testing, and corrosion.



Mosaic pattern wins first place $10,000 award in Alcoa, Architectural Mfrs. Assn. competition

An unusual mosaic pattern effect helped win first place for Alfred Clauss of Philadelphia in the recent design contest sponsored jointly by the Aluminum Co. of America and the National Assn. of Architectural Metal Manufacturers. It was the nation's first competition for new design and construction ideas for aluminum curtain wall buildings. Some $25,000 was given to a total of 18 prize winners during the recent annual convention of NAAMM at Bellaire, Fla. (Details on that meeting appeared in the April issue of *finish* starting on page 39.) The winning award offered a radically new idea for fastening metal panels to a building's framework, plus a novel way of featuring color to provide a mosaic effect. Color rendering assistance for Clauss was provided by a member of Clauss' firm, Bellante and Clauss—Philadelphia, Miss Jean Franck-sen. Second place winners were G. W. Gaulls and Bill Cox of Philadelphia. Third prize of $2,500 was awarded R. P. Darlington of Champaign, Ill. Fifteen honorable mention award winners each received $500.

Nash Metalware exec honored at JDA meet

Leo L. Sumin, secretary and treasurer of Nash Metalware, Inc., was honored for his service to the community by the metal products industry at its annual Joint Defense Appeal (JDA) dinner May 17 at the Hotel Waldorf-Astoria in New York. Sumin was presented an illuminated scroll for his "inspirational leadership in fighting bigotry and in preserving democratic American rights." Announcement of the award was made by Herbert Barchoff, president of the Eastern Brass and Copper Co., who is JDA Metal Products Division chairman.

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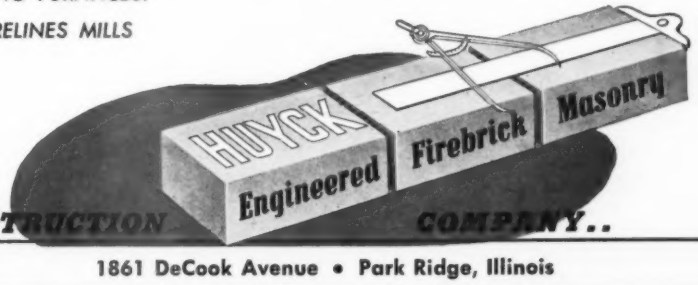
HUYCK *LINES AND RELINES MILLS*



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CHEMICALS ACP PROCESSES

APPLIANCE MEET CONTINUED

→ *from Page 31*

tion-Home Improvement plan and its ability to assist manufacturers and dealers of home appliances to ask *IAM* for complete information.

John R. McCord headed into a lively discussion on color. "Appliance color standardization is like the weather, he said. "Everybody talks about it but nobody does anything about it!" Some of the obstacles placed in the consumer's path to keep him on the "white line", McCord pointed out, are: (1) limited models, (2) premium price, (3) delayed delivery, (4) matching problems, (5) dealer "talk down," (6) customer color confusion.

A great potential in color

"Let's face up to one basic fact," McCord suggested. "Color has become the greatest new technique for creating obsolescence in appliances as well as other goods. It has been said that in certain fields color has done more to make merchandise obsolete than product improvement. Even if we won't completely subscribe to that statement, I believe we all will admit that COLOR has been a major factor in creating store traffic and exposing the buyers to merchandise so that sales could be made. However, McCord asserted, we all know the biggest percentage of sales were in conventional white with colored appliances making only nominal headway."

Cites need for color standardization

In his plea for giving color its just due and for consideration of standardization, McCord closed with the following statement of points: (1) Color is good! (2) Customers want color! (3) Color should be promoted not held back! (4) We should provide color efficiently — and to do so — (5) Efficient color programs should embrace standardization.

Following McCord, *Willard Johannsen*, publisher of *Electrical Dealer* magazine, presented a few comments based on research among appliance dealers. The public can be swayed to or from color by the dealer, Johannsen stated, but it appears that few dealers or salesmen have a real *fervor* for selling color.

Color as a sales tool

Most dealers think color should be sold as "packaged kitchens," Johannsen said, pointing out the rating, as the dealers see it, for color: (1) Color in new kitchen or home; (2) Color in remodeled kitchen or home; (3) Color for refrigerator or range replacements. The reasons dealers like color for remodeling were cited as (1) It puts his trade mark in the home; (2) It reduces competition (not many dealers are pushing color); (3) There is time for "delayed delivery" in cases of remodeling; (4) There is a higher margin.

In the discussion following, it was pointed out by a number of medium to smaller size manufacturers that they had taken the line of least resistance and "embraced" colors offered by larger producers such as G.E., Frigidaire, etc.

One suggestion was made that, in view of the fact that there are a limited number (about seven) of porcelain enamel frit manufacturers, this would be a logical starting point for any standardization program.

The suggestion seemed to carry with it the implication that organic finish producers would be brought into any consultations on colors due to the widespread use of both organic and ceramic color finishes in the appliance field.

Exhibitors report favorably

An informal survey of exhibitors at the IAM meeting indicated above average attendance at the individual exhibits and a high degree of satisfaction among the exhibitors with the measurable results.

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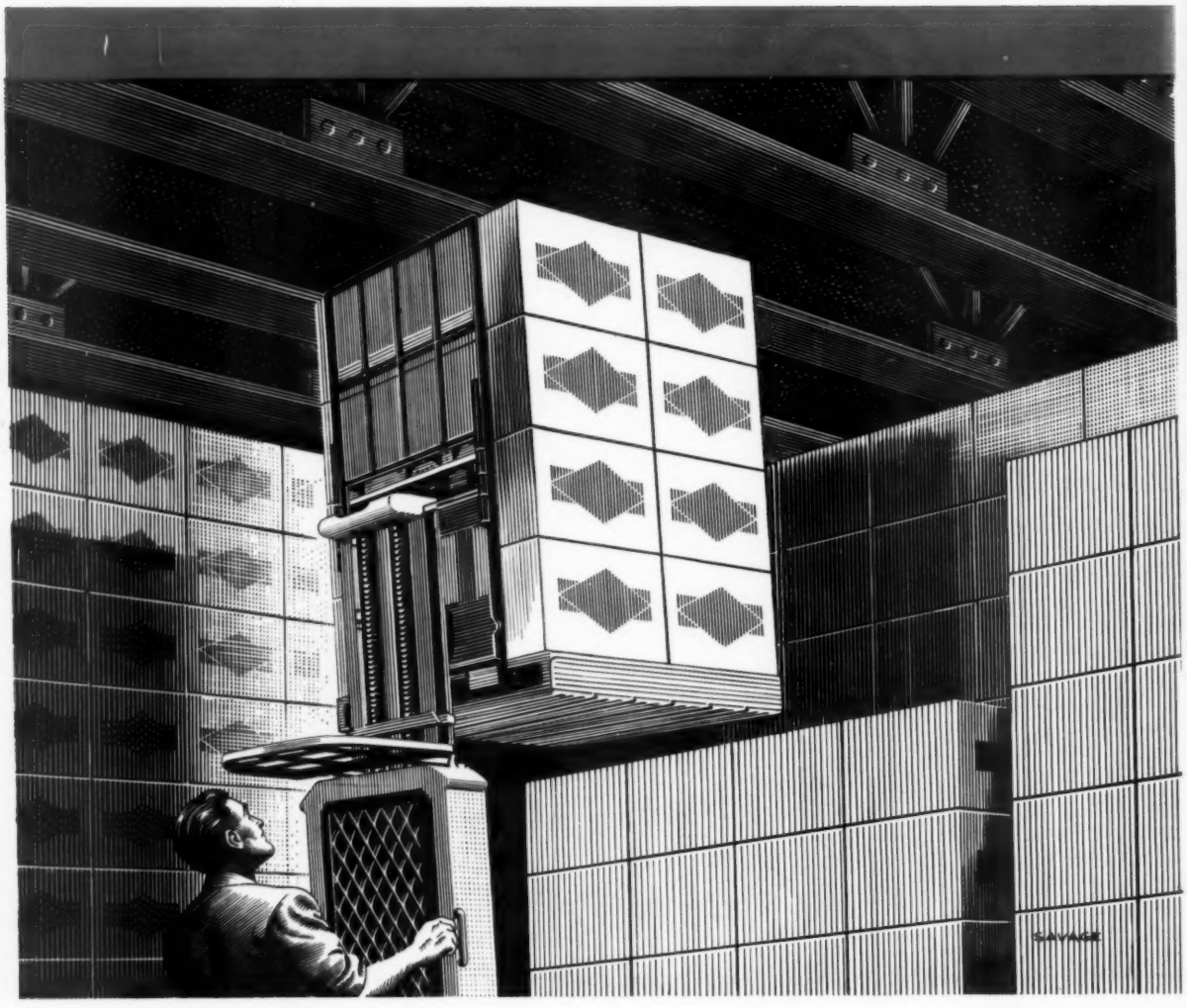

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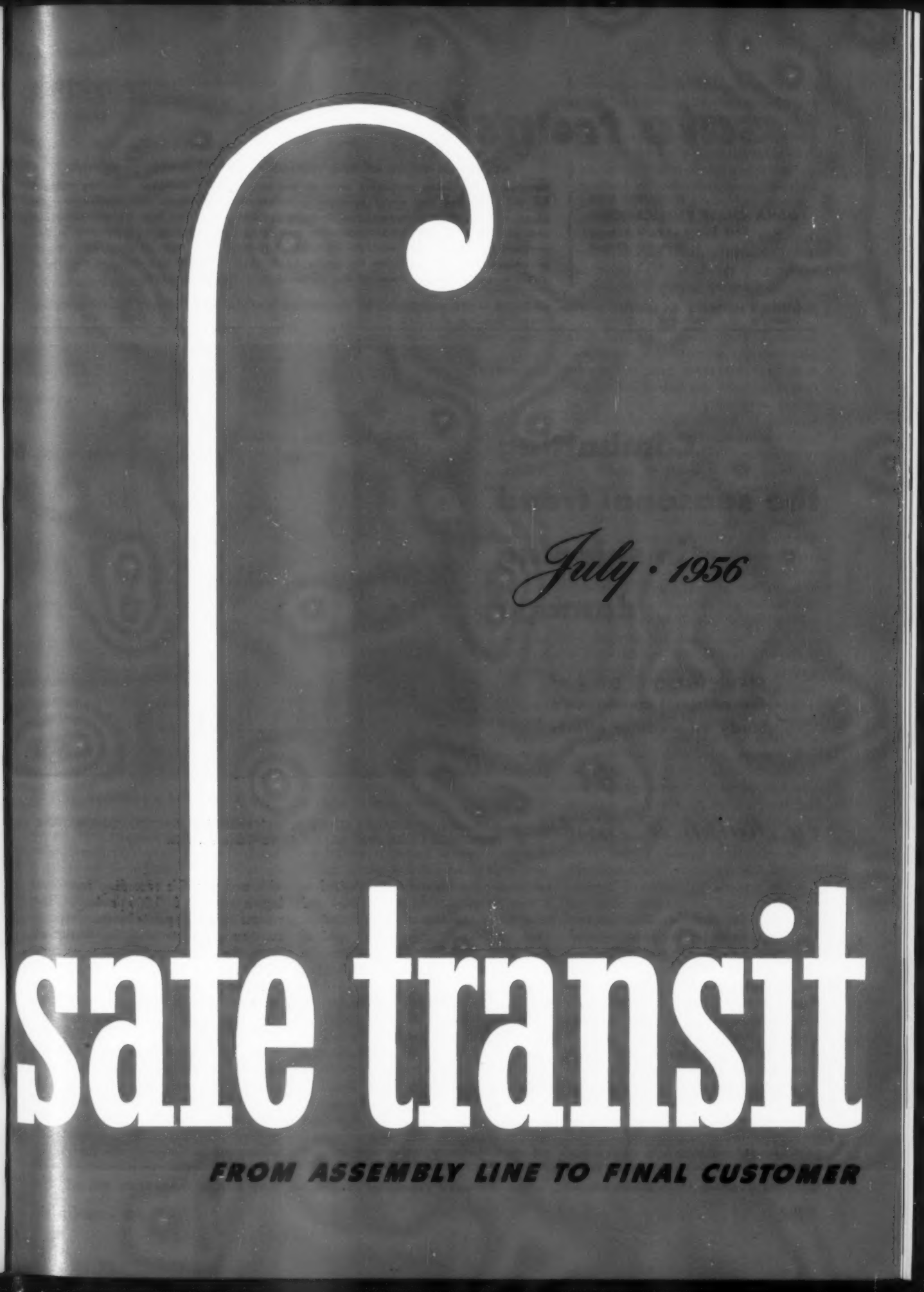
July · 1956
safe transit
FROM ASSEMBLY LINE TO FINAL CUSTOMER

July, 1956

safe transit

editorial voice of the national safe transit program

devoted to improving packaging methods and shipping and materials handling methods for the appliance and metal products manufacturing industries. This section contains plant experience information and industry advances for the use of all executives and plant men interested in improving packaging and shipping methods and in loss prevention. The section contains complete information on the national safe transit pre-shipment testing program for packaged finished products and detailed reports of divisions and sub-committees of the National Safe Transit Committee.

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Combatting the seasonal trend in shipping damage

progress report no. 3 of the national committee's study on weather effects

by Ralph F. Bisbee • MANAGER OF QUALITY CONTROL, WESTINGHOUSE ELECTRIC CORPORATION, MANSFIELD, OHIO; AND TECHNICAL CONSULTANT FOR FINISH.

Exclusive feature finish

The October, 1955 issue of *finish* outlined a National Safe Transit research project that has been in progress since 1950. As stated in the Safe Transit Committee, in its never first article, one of the most baffling problems encountered by the National ending battle to reduce handling and shipping losses to packaged products, is the apparent 'seasonal trend' in shipping damage.

While considerable progress has been made since the last report, the National Safe Transit Committee believes that this additional data should be publicized as it may be of considerable interest and value to all manufacturers and carriers. This additional information received from other sources further confirms the research work National Safe Transit has completed.

The NST Committee's 'seasonal trend' chart has been brought up-to-date through 1955 and represents a typical cross-section of major appliances and other metal products received at their destination in a damaged condition. The chart was plotted by determining the percent of products received in a damaged condition in relation to the total quantity reported received in shipments with each month's recording representing an average of 75,000 products. The reports cover shipments by every type of common carrier to all points in the 48 states, thus providing a cross-section of climatic and geographical conditions. Noted in plotting the 1955 chart is that the same seasonal pattern holds true when compared to previous years. The National Safe Transit Committee believes that since *all packaged products are handled and carried alike by common carrier that very definitely this same condition is happening with other kinds of products.*

The results shown on the chart are further substantiated by the increasing

Readers desiring the earlier reports, which included the detailed graphs, may obtain them from the editors

correlation data we have received since the last report was made. Here are a few examples.

Example #1 — Maytag Company

Mr. R. H. Thompson, general traffic manager of the Maytag Co., Newton, Iowa, has been working with National Safe Transit on this research problem since 1950 and submits the following information, which further correlates the research National Safe Transit has submitted from other sources. He says: "Using a different basis than used by you for our damage in transit charts *it is amazing to note the similarity of trend between our chart, your charts and the National trend.* Our experience and charts are based on carload shipments as against your method of damage to appliances. The extent of our records are based upon a report issued at destination indicating whether or not *any damage appeared to the bracing or containers.*

"Our charts show that we experience a great deal more damage, normally, *in the summer* than in the winter and we reached the conclusion that this is true because in warm weather *cars will run faster* when cut loose in switching than they will in the wintertime resulting in greater shock upon contact with other cars.

"Another thing which might contribute nation-wide is vacations which cause *inexperienced help to be used during hot weather* resulting in poor methods of bracing cars.

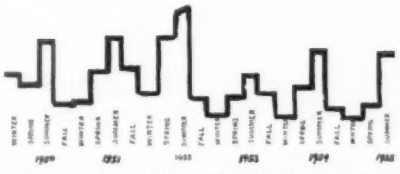
"Also, this vacation business of inexperienced help could also apply to the carriers as well as to industry."

Maytag Company's Seasonal Chart

Maytag's seasonal chart was also started back in 1950 paralleling the results already published by the National Safe Transit Committee. As Mr. Thompson brought out, even though the results were obtained in a little different manner, it is amazing how close it parallels the other information where reliable records are kept. The chart is a recap of all of Maytag's various kinds of carloadings, such as: mixed, straight cars, etc.

Example #2 — Carrier Trucking Lines

Mr. Glèn Jacob, Claim Agent, for the *Be-Mac Transport Co., Inc., St. Louis, Mo.,* in checking the Seasonal Trend Chart writes, ". . . . . we find that our experience is almost identical with yours. It is interesting indeed to find that the carriers who are keeping graphs all seem to come up with the same results."



Maytag reports on full carloads of automatics, conventionals, and mixed carloads were combined to show an overall picture of the situation as revealed in statistics compiled by the company's traffic division.

This is a significant report which further substantiates the fact that the seasonal chart *does not respect any particular type of product,* as this transport Company handles *all kinds* of manufactured products.

Mr. H. B. McManus of *Southwestern Transportation Co. Texarkana, Texas,* writes, "Recently I saw a copy of your bar graphs from 1950 to 1955 inclusive, showing "Seasonal Trend of Product Shipping Damage of Major Products."

"This is in line with graphs which I have been making and I am forwarding you copies of two of these graphs. On these graphs of mine you will *note the similarity of the pattern* which each line makes."

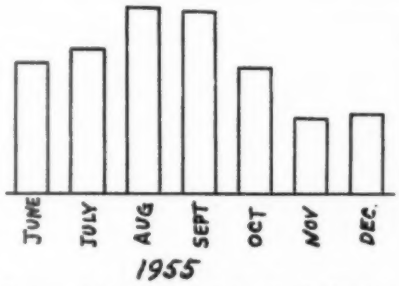
"I am of the firm opinion that we have begun something which, if followed over a period of time, might give us information which would be valuable in eliminating claims. This should be followed up. I am just passing this on to you for your information and for comparative purposes."

Under date of February 10, 1956, he sent us a graph which shows the seasonal trend for shipping damages in 1955. Again, this further substantiates that *during the summer months* the national shipping damage is almost double that of the winter months.

What Are The Causes?

I believe it is well to repeat the following: These probable causes have been compiled from information gathered to date:

Faster speeds in summer — Hot cars increase railroad switching impacts, with a "hot" car defined as one taken from a train just arrived from a long run, while a "cold" car is one that has been standing in the yards for a considerable time. Also, the speeds of trucks and trains are considerably accelerated during the good weather in summer months compared with winter months.



Damage claims were used by the Southwestern Transportation Co. to draw up a trend line on the effect of the seasons on damages to shipments. No particular product was used in this study. Rather, any and all cargoes shipped by the company were used in the compilation.

Vacations — Inexperienced and part-time personnel during summer vacation months are not always aware of the importance of proper handling of packaged products.

Humidity—Summer vs. Winter — Tests conducted by the NST Technical Committee, together with representative laboratories and manufacturers, show that it takes far less vibration and impact to cause damage to containers during the high humidity months of summer than during the winter months. Tests also show that during summer it takes less weight to crush the container on the bottom of a stack in the warehouse or at the end of a car.

Effect of Weather on Men — According to physiologists, there is a greater likelihood for more carelessness, even with regular employees, in hot humid weather. This, added to the vacation relief employees, adds up to an important factor in heavier damage during the summer months.

The National Safe Transit Committee is especially interested in any project that will serve to further reduce shipping damage to packaged products. The results of the National Safe Transit research project completed to date, with the additional data being received frequently from other sources of carriers and manufacturers, shows beyond any question of doubt its validity and importance. Therefore, we must find and conquer the reason for this 'seasonal trend' that is causing greater losses to American-made products during the summer months. To accomplish this, the same co-operative team work will continually be required, from carriers, manufacturers, laboratories, and others, that the National Safe Transit Committee has enjoyed from its beginning.

After reading this article you may find you have ideas from your own experiences that will lend assistance in this project. If so, please send us your ideas and/or suggestions for any solution as to how this situation may be improved. We will be only too glad to recap this information from which, in time, we hope to effect a national plan of action for further reducing summer losses. Direct all correspondence to The National Safe Transit Committee, 1145 Nineteenth St. N.W., Washington, D.C.

SAFE TRANSIT NEWS

NATIONAL SAFE TRANSIT COMMITTEE

Associations Building, 1145 - 19th St., N. W., Washington 6, D. C.

Montgomery Ward Continues Safe Transit Activities - Retailers are giving increasing attention to the Safe Transit label. An example is the activity of Montgomery Ward which has specified that each of their Radio, Phonograph and Television models meet the Safe Transit tests and be identified with the Safe Transit label. The company further sent a general bulletin to its store and service managers throughout the country notifying them of this activity.

- - - - - -

ATA Meeting Features Safe Transit - Mr. R. F. Bisbee, General Chairman of the NST Committee, was guest speaker at the June 21st Cleveland, Ohio meeting of the National Freight Claim Council of American Trucking Associations, Inc. The meeting also included a preview showing of NST's new color-sound film, "The Safe Transit Story".

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Active Regional Chairman - Mr. L. W. Schmucker, recently appointed Regional Chairman for the Kansas area, has already presented the National Safe Transit story to members of the Traffic Club of Wichita and to members of the Manufacturers Club of Wichita. On July 19, he will be speaking again on Safe Transit at the monthly meeting of the Missouri-Kansas Chapter of the Society of Industrial Packaging and Materials Handling Engineers. Mr. Schmucker is with The O. A. Sutton Corp., Wichita, Kansas, and illustrates his telling presentation with his company's own NST pre-testing program.

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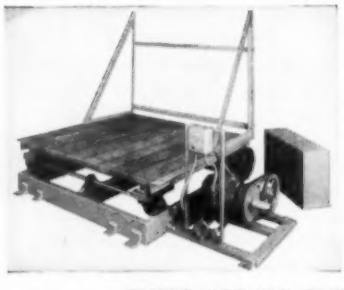

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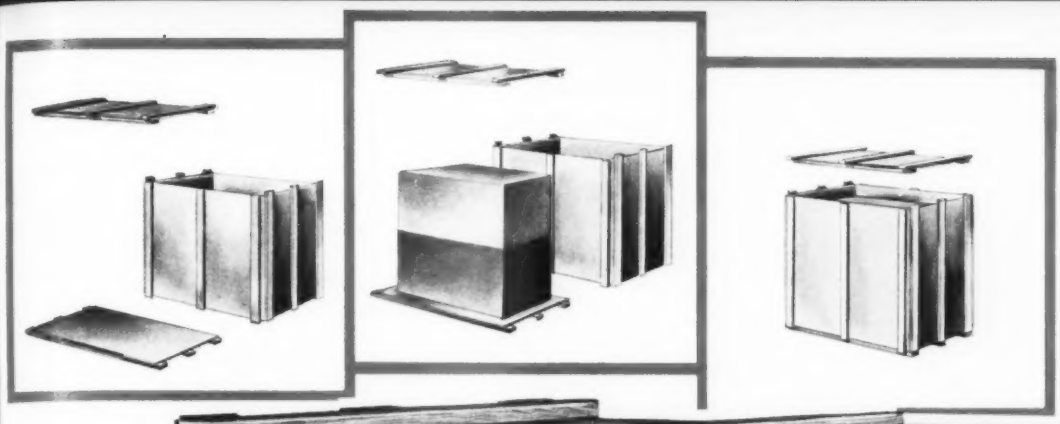

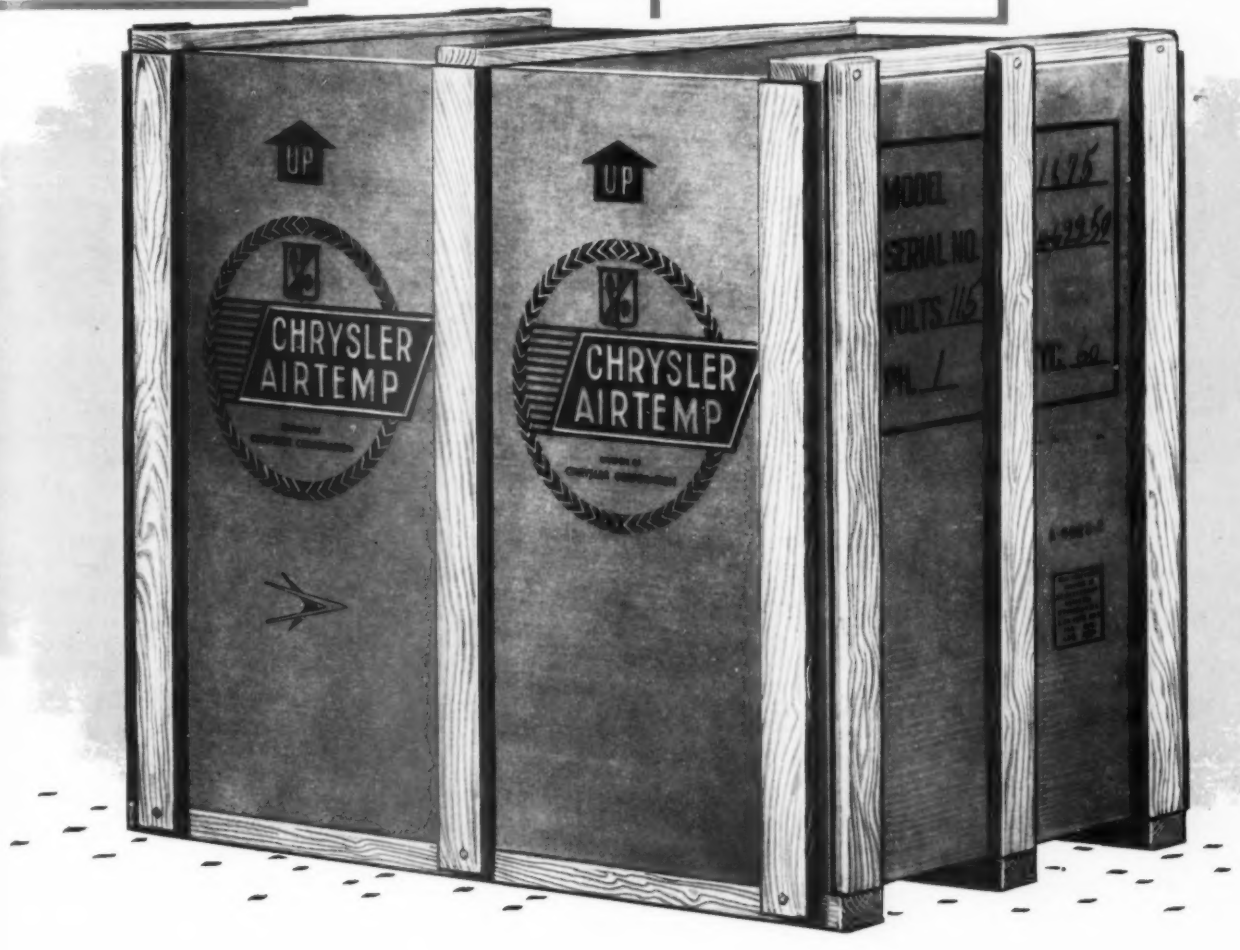

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ADVERTISERS' INDEX

	PAGE
AMERICAN CHEMICAL PAINT	88
APOLLO METAL WORKS	14
ARMCO STEEL CORP.	1
BINKS MFG. CO.	69
BURDETT MFG. CO.	23
CERAMIC COLOR & CHEMICAL MFG. CO.	2nd Cover
CHICAGO MILL & LUMBER CO.	67
CHICAGO VITREOUS CORP.	22
CUYAHOGA SPRING CO.	68
DANIELSON MFG. CO., V. W.	25
DETREX CORP.	76
DRAKE MFG. COMPANY	77
DU PONT DE NEMOURS CO., INC., E. I.	38
ELGIN SOFTENER CORP.	46
FAHRALLOY CO.	84
FERRO CORP.	26
FINISH	31
FOLLANSBEE STEEL CORP.	78
GAYLORD CONTAINER CORP.	90
GAYNES ENGINEERING CO.	ST-4
GRAND RAPIDS VARNISH CORP.	82
HARRINGTON & KING PERFORATING CO.	5
O. HOMMEL CO.	2
HUYCK CONSTRUCTION CO.	87
INGRAM-RICHARDSON, INC.	81
KING-SEELEY CORP.	17
L. A. B. CORP.	ST-4
LAU BLOWER CO., THE	71
MACCO PRODUCTS CO.	8
MARSCO MFG. CO.	24
MILLS PRODUCTS, INC.	18, 19
NATIONAL LOCK CO.	77
NEWCOMB DETROIT	77
NEW PROCESS D-ENAMELING CORP.	74
NORTHWEST CHEMICAL CO.	21
PEMCO CORP.	50, 51
PENNSYLVANIA SALT MFG. CO.	32
PITTSBURGH PLATE GLASS CO.	20
PYRAMID MOULDINGS, INC.	6
RANSBURG ELECTRO-COATING CORP.	7
REYNOLDS METALS CO.	9, 10, 11, 12
REGULATOR ENGINEERING & DEVELOPMENT CO.	46
ROLL COATER, INC.	64
J. O. ROSS ENGINEERING CORP.	75
SHELL CHEMICAL CO.	86
SHERWIN-WILLIAMS CO.	55
SORENG DIVISION	4th Cover
TECHNIC, INC.	89
TITANIUM ALLOY MFG. DIV.	4
TITANIUM PIGMENT CORP.	13
UNION STEEL PRODUCTS CO.	3rd Cover
UNITED STATES GYPSUM	36, 37
VANCE INDUSTRIES	68
VITREOUS STEEL PRODUCTS CO.	52
WATKINS CONTAINER MFRS.	ST-5
WEAN EQUIPMENT CORP.	48, 49
WHEELING STEEL CORP.	47
WINNECONNE STAMPING CO.	68
YOUNGSTOWN SHEET & TUBE CO.	16

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knobs are held in a hopper, at the left side of the six-station index table of the press. From this hopper, they are hand-fed into key-slotted dies. Purpose of the key-way is to insure their being in the same relative location around the face of the dial, on each knob. As the table indexes, a piece of work is brought under the ram, which exerts one-half ton pressure.

The foil marker is mounted directly on the press ram, and feeds foil automatically at each stroke, so a new portion of foil is in place for each marking. After being embossed and marked at the ram station, the dial table carries the piece to the first station beyond, where a cam-riser lifts the part from its seat. At the second station past the ram, a cam-actuated air blast blows the finished knob into an off-bearing chute. The index or dial table is sufficiently large in diameter that the operator is never near the press ram, and her hands are always in a perfectly safe zone.

Eight hundred parts per hour are marked in this way with only one girl operator. Six different marking jobs are handled on one press by Nash-Kelvinator, and there are no rejects, due to uneveness of marking, or fill. Tooling on the press may be changed readily. It is simply a matter of removing a pair of bolts on each die set. The amount of floor space which has been saved is spectacular, for the hand operation formerly employed required around 300 square feet.